NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(266)
January 1985

Aerospace Medicine & Biology

SPECIAL NOTICE ENCLOSED
NEW FOREIGN TECHNOLOGY INDEX INCLUDED IN THIS ISSUE

Aerospace Medicine and Biology

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series)	N84-33366 - N84-35284
IAA (A-10000 Series)	A84-46526 - A84-49697

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

SPECIAL NOTICE

FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

Documents referred to in this bibliography whose country of intellectual origin is other than the United States are listed in the Foreign Technology Index (see page D-1).

A great deal of excellent scientific and technical work is done throughout the world. To the extent that U.S. researchers, engineers, and industry can utilize what is done in foreign countries, we save our resources. We can thus increase our country's productivity.

We are testing out this approach by helping readers bring foreign technology into focus. We would like to know whether it is useful, and how it might be improved.

Check below, tear out, fold, staple, and return this sheet.

Foreign Technology Index:

- ☐ Isn't useful, so should be discontinued.
- ☐ Is useful, but other sources can be used.
- ☐ Is useful and should be continued.
- ☐ Suggestions for improvements to future issues:

_____

_____

_____

_____

Name (optional)_____

Organization (optional)_____

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

FIRST CLASS MAIL

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

National Aeronautics & Space Administration
NASA Headquarters Mail Code NIT-2
Washington, D.C. 20546

NASA

NASA SP-7011(266)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 266)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in December 1984 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1985
National Aeronautics and Space Administration
Washington, DC

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of $7.00 domestic; $14.00 foreign.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 148 reports, articles and other documents announced during December 1984 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1984 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A84-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at $8.50 per document. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand. Standing order microfiche are available at the rate of $1.45 per microfiche for *IAA* source documents.

Minimum air-mail postage to foreign countries is $2.50 and all foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to AIAA Technical Information Service. Please refer to the accession number when requesting publications.

STAR ENTRIES (N84-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page viii.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Document Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction).

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts.* Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free.

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vii.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN: An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *Star*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and * from ESA - Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 50 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. Over 1,300 other depositories also exist. A list of the regional GPO libraries appears on the inside back cover.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-- 1	-- 2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

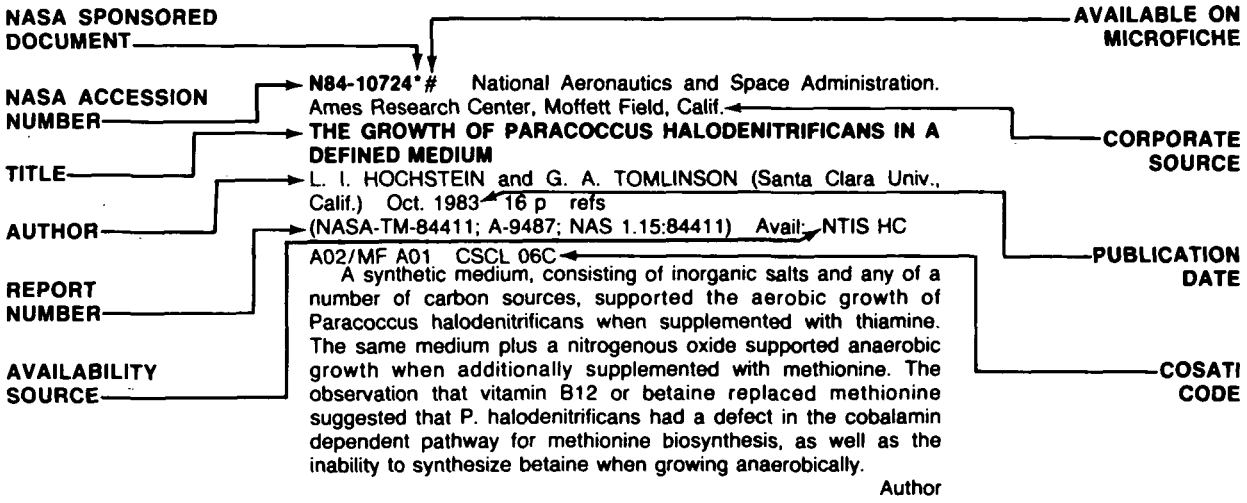
EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

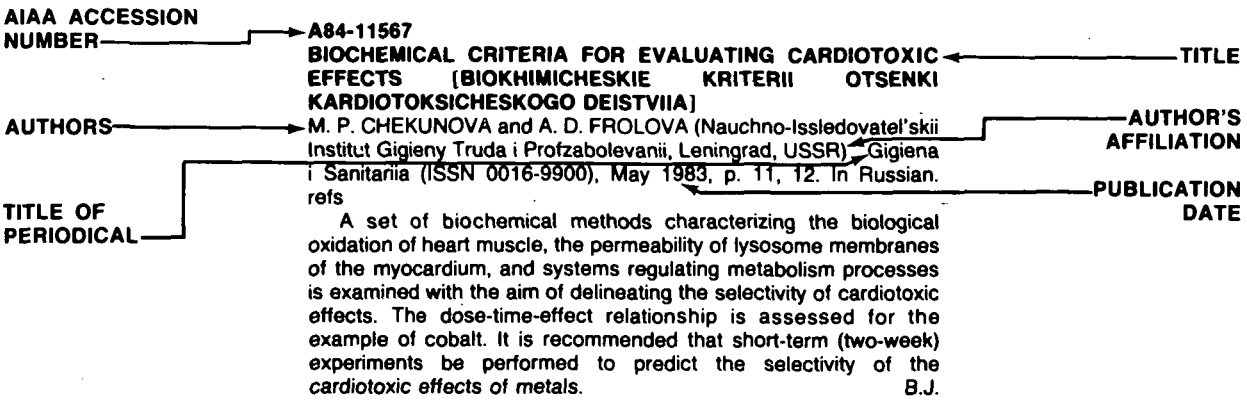
Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

TABLE OF CONTENTS

TYPICAL CITATION AND ABSTRACT FROM *STAR*



TYPICAL CITATION AND ABSTRACT FROM *IAA*



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 266)

JANUARY 1985

51

LIFE SCIENCES (GENERAL)

Includes genetics.

A84-46550* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ELECTRON TRANSPORT IN PARACOCCUS HALODENITRIFICANS AND THE ROLE OF UBIQUINONE
L. I. HOCHSTEIN and S. E. CRONIN (NASA, Ames Research Center, Extraterrestrial Research Div., Moffett Field, CA) Canadian Journal of Microbiology (ISSN 0008-4166), vol. 30, no. 5, 1984, p. 572-577. Previously announced in STAR as N83-28832. refs

The membrane-bound NADH oxidase of Paracoccus halodenitrificans was inhibited by dicoumarol, 2-n-heptyl-4-hydroxyquinoline-N-oxide (HQNO), and exposure to ultraviolet light (at 366 nm). When the membranes were extracted with n-pentane, NADH oxidase activity was lost. Partial restoration was achieved by adding the ubiquinone fraction extracted from the membranes. Succinate oxidation was not inhibited by dicoumarol or HQNO but was affected by ultraviolet irradiation or n-pentane extraction. However, the addition of the ubiquinone fraction to the n-pentane-extracted membranes did not restore enzyme activity. These observations suggested the reducing *equivalents from succinate entered the respiratory chain on the* oxygen side of the HQNO-sensitive site and probably did not proceed through a quinone. Author

A84-47049
DISRUPTION OF THE TERRESTRIAL PLANT ECOSYSTEM AT THE CRETACEOUS-TERTIARY BOUNDARY, WESTERN INTERIOR
R. H. TSCHUDY, C. L. PILLMORE (U.S. Geological Survey, Denver, CO), C. J. ORTH, J. S. GILMORE, and J. D. KNIGHT (Los Alamos National Laboratory, Los Alamos, NM) Science (ISSN 0036-8075), vol. 225, Sept. 7, 1984, p. 1030-1032. Research supported by the U.S. Department of Energy. refs

The palynologically defined Cretaceous-Teritary boundary in the western interior of North America occurs at the top of an iridium-rich clay layer. The boundary is characterized by the abrupt disappearance of certain pollen species, immediately followed by a pronounced, geologically brief change in the ratio of fern spores to angiosperm pollen. The occurrence of these changes at two *widely separated sites implies continentwide disruption of the* terrestrial ecosystem, probably caused by a major catastrophic event at the end of the period. Author

A84-47264
NEURONAL PHOSPHOPROTEINS - PHYSIOLOGICAL AND CLINICAL IMPLICATIONS
E. J. NESTLER (Yale University, New Haven, CT), S. I. WALAAS, and P. GREENGARD (Rockefeller University, New York, NY) Science (ISSN 0036-8075), vol. 225, Sept. 21, 1984, p. 1357-1364. Research supported by the McKnight Foundation and U.S. Air Force; U.S. Environmental Protection Agency. refs
(Contract EPA-CR-810608; PHS-MH-39327; PHS-NS-21550)

Nestler and Greengard (1984) have found that many types of physiological stimuli produce diverse synaptic responses in the nervous system by regulating the state of phosphorylation of specific phosphoproteins in target neurons. It is pointed out that the detection, purification, and characterization of neuronal phosphoproteins, and the elucidation of their physiological roles, is leading to an understanding of the molecular mechanisms by which neurons react with specific physiological responses to various stimuli. The present article provides a summary of recent evidence for a vital role of phosphoproteins in neuronal function. Attention is given to the regulation of neuronal protein phosphorylation, the classes of neuronal proteins regulated by phosphorylation, the regional distribution of neuron-specific phosphoproteins, phosphoproteins of the basal ganglia, and cellular messenger interactions at the level of protein phosphorylation. G.R.

A84-47597
SKETCHES OF THE THEORY AND PRACTICE OF HUMAN ECOLOGY [OCHERKI TEORII I PRAKTIKI EKOLOGII CHELOVEKA]
V. P. KAZNACHEEV Moscow, Izdatel'stvo Nauka, 1983, 264 p. In Russian. refs

Consideration is given to contemporary problems in the development and maintenance of public health under modern technological conditions. On the basis of recent ecological investigations, methodological and theoretical aspects of the study of the ecology of biosphere and the noosphere are discussed, with particular emphasis given to the work of Vernadskii. An analysis is made of certain concepts and social requirements as to how they relate to ideas about health, human ecology, and the anthropoecological aspects of a proposed system for improving *the quality of life and alleviating the ecological problems of stress* and fatigue in human beings. I.H.

A84-47599
QUANTITATIVE REGULARITIES OF RADIATION IMMUNOLOGY [KOLICHESTVENNYE ZAKONOMERNOSTI RADIATSIONNOI IMMUNOLOGII]
V. N. MALTSEV Moscow, Energoatomizdat, 1983, 88 p. In *Russian. refs*

A statistical analysis of data (published in the literature and the author's own) on radiation immunology was carried out to elucidate the functional relationship between radiation dose and the biological effects evoked. The results make it possible to: (1) compare the radiation resistance of mechanisms limiting the growth and reproduction of autoflora microbes; (2) give a quantitative assessment of the significance of endogenic infection in the pathogenesis of the death of irradiated organisms; (3) disclose the causes of the decline of the bactericidal activity of blood serum, damage to the phagocytic mechanisms of defense, and the inhibition of the synthesis of various antibodies; and (4) acquire

a greater understanding of the role of the autoimmune component in the pathogenesis of acute radiation sickness. B.J.

A84-47789
MECHANISM OF THE PROLONGATION OF LIFE BY DIBUNOL (BUTYLATED HYDROXYTOLUENE) [O MEKHANIZME PRODLENIIA ZHIZNI DIBUNOLOM /BUTILIROVANNYM GIDROKSITOLUOLOM/]
V. K. KOLTOVER, E. N. GORBAN, and P. S. MAIOR (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Chernogolovka, USSR; Akademiia Meditsinskikh Nauk SSSR, Kiev, Ukrainian SSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 2, 1984, p. 497-500. In Russian. refs

The EPR technique was used to study the effect of dibunol on two important subsystems of neurohumoral regulation: the blood and adrenal cortical fluid. Experiments performed on Wistar rats show that the effect of dibunol is similar to that of corticotropin, and that dibunol interacts directly with transport proteins of the blood, thus affecting the transport and concentration of hormones in the tissues. Therefore, dibunol is capable of acting as a stress factor. It is suggested that the regular administration of dibunol to animals as a mild stress factor can 'train' the neurohumoral system and thus enhance the adaptive capacities of the body. It is precisely this 'training' effect which constitutes the basis of the medicinal (life-prolonging) properties of dibunol. B.J.

A84-47795
ELECTROCHROMIC REACTIONS OF RHODOPSIN [ELEKTROKHROMNYE REAKTSII RODOPSINA]
S. M. MAZEL, I. B. FEDOROVICH, G. P. BORISEVICH, M. A. OSTROVSKII, and A. B. RUBIN (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 3, 1984, p. 723-725. In Russian. refs

The electrochromic effect in the visual pigment rhodopsin was observed experimentally. This confirms the hypothesis that electron-conformational changes in the microenvironment of retinal play an important role in spectral transformations of retinal-containing proteins. B.J.

A84-47796
BIOMECHANICAL FOUNDATIONS OF THE THERMAL INSULATION OFF HOMOIOTHERMS [BIOMEKHANICHESKIE OSNOVY TERMOIZOLIATSII GOMOIOTERMNYKH]
I. F. OBRAZTSOV, M. A. KHANIN, and O. G. BAT (Akademiia Nauk SSSR, Institut Atomnoi Energii, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 3, 1984, p. 728-731. In Russian. refs

A mathematical model is devised for investigating the biomechanical features of the thermal insulation of homoiotherms. The optimal heat transfer coefficient is evaluated as a function of ambient temperature, and the critical body weight is assessed as a function of the mean winter temperature of the environment. It is shown that homoiotherms can be divided into two groups: in the first group, the lower bound of the thermally neutral zone is higher than the mean winter temperature of the environment; in the second group, they coincide. B.J.

A84-47797
FORMATION OF NEW MICROVESSELS IN THE SKELETAL MUSCLES OF RATS EXPOSED TO HYPOBARIC HYPOXIA FOR A WEEK [FORMIROVANIE NOVYKH MIKROSOSUDOV V SKELETNYKH MYSHTSAKH KRYS, PODVERGNUTNYKH NEDEL'NOMU VLIIANIIU GIPOBARICHESKOI GIPOKSII]
M. V. KONDASHEVSKAIA, V. B. KOSHELEV, and I. M. RODIONOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 3, 1984, p. 748-751. In Russian. refs

A84-47891
ORIGINS OF BIOMOLECULAR HANDEDNESS
S. F. MASON (King's College, London, England) Nature (ISSN 0028-0836), vol. 311, Sept. 6, 1984, p. 19-23. refs

Classical mechanisms proposed for the transition from racemic geochemistry to homochiral biochemistry in terrestrial evolution generally ascribe to chance the particular handed choice of the L-amino acids and the D-sugars by self-replicating systems. The parity-violating weak neutral current interaction gives rise to an energy difference between a chiral molecule and its mirror-image isomer, resulting in a small stabilization of the L-amino acids and the L-peptides in the alpha-helix and the beta-sheet conformation relative to the corresponding enantiamer. The energy difference suffices to break the chiral symmetry of autocatalytic racemic reaction sequences in an open nonequilibrium system. Author

A84-47963
CELL MEMBRANE NONLINEAR RESPONSE TO AN APPLIED ELECTROMAGNETIC FIELD
G. FRANCESCHETTI and I. PINTO (Napoli, Universita, Naples, Italy) IEEE Transactions on Microwave Theory and Techniques (ISSN 0018-9480), vol. MTT-32, July 1984, p. 653-658. Research supported by the Consiglio Nazionale delle Ricerche. refs

The transmembrane potential difference induced by an impressed electromagnetic field in a spherical homogeneous cell with nonlinear membrane is obtained using the Volterra series formalism. Some representative computed results are presented. It is found that fields of 100 V/m may trigger detectable cellular effects below 100 MHz. C.D.

A84-48036
VARIATION IN THE COMPOSITION OF SUPRAMOLECULAR DNA-BOUND PHOSPHOLIPIDS IN THE THYMUS AND LIVER OF GAMMA-IRRADIATED RATS [IZMENENIE SOSTAVA FOSFOLIPIDOV, SVIAZANNYKH S NADMOLEKULIARNOI DNK TIMUSA I PECHENI GAMMA-OBLUCHENNYKH]
Z. I. KRASICHKOVA and N. B. STRAZHEVSKAIA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 451-455. In Russian. refs

A84-48037
THE CONDITION OF BETA-ADRENERGIC AND GABA-ERGIC RECEPTORS IN THE BRAINS OF RATS FOLLOWING EXPOSURE TO HIGH DOSES OF IONIZING RADIATION [SOSTOIANIE BETA-ADRENERGICHESKIKH I GAMK-ERGICHESKIKH RETSEPTOROV MOZGA KRYS POSLE VOZDEISTVIIA VYSOKIKH DOZ IONIZIRUIUSHCHEI RADIATSII]
IU. A. SEMIN, A. S. SHERCHUK, and B. V. DUBOVIK (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 476-480. In Russian. refs

A84-48038
DAILY AND SEASONAL RHYTHMS OF RADIOSENSITIVITY IN ALBINO MONGREL RATS [SUTOCHNYE I SEZONNYE RITMY RADIOCHUVSTVITEL'NOSTI BELYKH BESPORODNYKH KRYS]
I. F. SHLUMUKOVA, IA. I. SERKIZ, E. E. CHEBOTAREV, I. O. PAVLENKO, V. V. SHLAPATSKAIA, and V. P. SVIRGUN (Akademiia Nauk Ukrainskoi SSR, Institut Problem Onkologii and Institut Fiziologicheskoi Khimii, Kiev, Ukrainian SSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 495-498. In Russian. refs

A84-48039
A STUDY OF THE RADIOBIOLOGICAL ASPECTS OF THE RIBOSOMAL GENES OF ANIMALS [ISSLEDOVANIE RIBOSOMAL'NYKH GENOV ZHIVOTNYKH V RADIOBIOLOGICHESKOM ASPEKTE]
A. A. VETCHINKINA and G. A. KRITSKII (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 502-505. In Russian. refs

The ribosome content of DNA in mammals with varying radiosensitivity (guinea pigs, rats, rabbits, and man) is determined experimentally. It is shown that as the number of ribosomal genes in DNA grows, the resistance of the organism to radiation increases significantly. It is also established that the ribosome content of DNA in rabbit thymus increases significantly two days after total-body gamma-irradiation at a dose level of two grams-roentgen. A series of graphs is presented which describes the statistical correlations in detail. I.H.

A84-48040
THE EFFECT OF CHANGES IN MITOCHONDRIA MEMBRANE LIPIDS ON 2MG(+)-DEPENDENT ATPASE ACTIVITY [VLIIANIE IZMENENII V LIPIDAKH MEMBRAN MITOKHONDRII NA AKTIVNOST' 2MG(+)- ZAVISIMOI ATFAZY]
E. B. BURLAKOVA, IU. A. ZASLAVSKII, and L. N. SHISHKINA (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 505-508. In Russian. refs

A84-48041
THE DYNAMICS OF CHROMOSOME ABERRATIONS IN MONKEY BONE MARROW CELLS FOLLOWING PROLONGED IRRADIATION [DINAMIKA ABERRATSII KHROMOSOM V KLETKAKH KOSTNOGO MOZGA OBEZ'IAN POSLE PROLONGIROVANNOGO OBLUCHENIIA]
L. P. KOSICHENKO, V. S. BARKAIA, and R. A. TORUA (Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 528-530. In Russian. refs

The effect of prolonged gamma-irradiation at low intensity (3.87 microamps/kg) on the bone marrow cells of Macaca rhesus monkeys is investigated experimentally. The cumulative dose was between 214.14 and 221.88 mC/kg and was administered over 15 hours and 30 minutes. Follow up examinations were made 2, 4, 18, 30, and 42 months following exposure. Statistically significant differences were found in the frequency of chromosome aberrations and in the percentage of polyploid bone marrow cells after 42 months when compared to the number of spontaneous aberrations. I.H.

A84-48043
THE DISTINCTIVE FEATURES OF THE POSTRADIATION REACTION OF HEMOPOIETIC TISSUE TO THE ADMINISTRATION OF ADRENALINE [OSOBENNOSTI POSTRADIATSIONNOI REAKTSII KROVETVORNOI TKANI PRI PRIMENENII ADRENALINA]
I. B. SMIRNOVA, G. V. DONTSOVA, M. M. KONSTANTINOVA, and O. N. RAKHMANINA (Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 545-548. In Russian.

A84-48044
RADIOPROTECTIVE ACTIVITY OF SOME HYPOTENSIVE DRUGS [PROTIVOLUCHEVAIA AKTIVNOST' NEKOTORYKH GIPOTENZIVNYKH PREPARATOV]
V. V. ZNAMENSKII, V. P. BEKETOV, A. K. TRUKHMANOV, P. G. ZHEREBCHENKO, and V. P. EVDAKOV (Ministerstvo Zdravookhraneniia SSSR, Institut Biofiziki, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 548-550. In Russian. refs

An experimental investigation is described which examined the radioprotective effects of seven different hypotensive drugs in 716 hybrid mice. It is found that the drug clonidine had pronounced radioprotective effects when administered in different ways, at various doses, and at different times before irradiation at 9 grams-roentgen. When the acid residue in clonidine was substituted for the drug, the radioprotective effect was diminished. A graph is provided which lists the various hypotensive drugs examined in the study and compares their relative radioprotective effects. I.H.

A84-48045
THE KINETICS OF EOSINOPHILIC LEUKOCYTES DURING THE CONTINUOUS GAMMA-IRRADIATION OF RATS [KINETIKA EOZINOFIL'NYKH LEIKOTSITOV PRI NEPRERYVNOM GAMMA-OBLUCHENII KRYS]
T. M. ZUKHBAIA (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 551-553. In Russian. refs

The recurring features of variations in the population of eosinophilic leukocytes in the bone marrow and peripheral blood of rats continuously exposed to gamma-radiation was investigated, for dose rates ranging from 0.1 to 4 grams-roentgen/day. The time intervals at which eosinophils were eliminated from the bone marrow were determined and are presented in a graph. Some mechanisms for eosinophilopoiesis regulation during the continuous exposure to gamma-radiation are discussed. I.H.

A84-48046
THE EFFECT OF CHRONIC GAMMA-IRRADIATION ON CHIPMUNKS KEPT IN VIVARIUM [DEISTVIE KHRONICHESKOGO GAMMA-OBLUCHENIIA NA BURUNDUKOV V USLOVIIAKH VIVARIIA]
N. G. ZAGORSKAIA, L. D. MATERII, and A. G. KUDIASHEVA (Akademiia Nauk SSSR, Institut Biologii, Syktyvkar, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 561-563. In Russian. refs

The dynamic aspects of changes in the body mass and weight of two groups of 52 chipmunks were studied in normal conditions and during chronic gamma-irradiation (five continuous months) at low dose-rates (46.3 pA/kg). It is found that the animals in the experimental group exhibited higher body mass and lower metabolic activity during the hibernation period, and this is interpreted as a protective reaction of the organism to the chronic effects of the low-dose radiation. I.H.

A84-48047
THE EFFECT OF LOW-INTENSITY LASER RADIATION ON CHOLINESTERASE ACTIVITY IN THE BRAINS OF RATS [VLIIANIE NIZKOINTENSIVNOGO LAZERNOGO IZLUCHENIIA NA AKTIVNOST' KHOLINESTERAZY MOZGA KRYS]
A. T. PIKULEV, I. P. KHRIPCHENKO, and G. I. LEPESHEVA (Belorusskii Gosudarstvennyi Universitet, Minsk, Belorussian SSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 565-568. In Russian. refs

A84-48163
THE ROLE OF NEURONS FROM DIFFERENT HYPOTHALAMIC REGIONS IN THE RESPONSE OF AN ORGANISM TO HYPOXIA [UCHASTIE NEIRONOV RAZLICHNYKH OTDELOV GIPOTALAMUSA V REAKTSII ORGANIZMA NA GIPOKSIIU]
I. N. IANVAREVA, T. R. KUZMINA, and O. M. VERBIANOVA (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, June 1984, p. 747-752. In Russian. refs

A84-48164
THE EFFECT OF SHORT-TERM HYPERTHERMIA ON CATECHOLAMINE CONTENT IN THE ORGANS OF WHITE RATS [VLIIANIE KRATKOVREMENNOI GIPERTERMII NA SODERZHANIE KATEKHOLAMINOV V ORGANAKH BELYKH KRYS]
KH. A. MEZIDOVA, B. N. MANUKHIN, and F. F. SULTANOV (Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR; Akademiia Nauk Turkmenskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Ashkhabad, Turkmen SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, June 1984, p. 795-801. In Russian. refs

A84-48165
VARIATION IN THE OSMOLARITY OF ARTERIAL BLOOD DURING INTENSIVE MUSCLE EXERCISE [IZMENENIE OSMOLIARNOSTI ARTERIAL'NOI KROVI PRI INTENSIVNOI MYSHECHNOI RABOTE]
T. P. KOSTENKO, I. IU. SERGEEV, N. A. MEDVEDEVA, and I. M. RODIONOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, June 1984, p. 818-821. In Russian. refs

In experiments with 16 cats it is demonstrated that a prolonged rhythmic muscle contraction in four limbs as a result of the stimulation of transected motor nerve endings is coincident with an increase in the osmotic pressure of arterial and venous blood plasma in both the blood vessels and the heart. The increase in osmolarity is closely associated with the following phenomena: an increase in the minute volume of the heart; a decrease in arterial pressure; and enhanced blood flow through the limbs. It is proposed that osmolarity is an important factor in the adaptation of the cardiovascular system to intensive physical exercise. I.H.

A84-48753
MANUAL OF SPACE BIOLOGY AND MEDICINE (3RD REVISED AND ENLARGED EDITION) [SPRAVOCHNIK PO KOSMICHESKOI BIOLOGII I MEDITSINE /3RD REVISED AND ENLARGED EDITION/]
A. I. BURNAZIAN, ED. and O. G. GAZENKO, ED. Moscow, Izdatel'stvo Meditsina, 1983, 352 p. In Russian. No individual items are abstracted in this volume.

Consideration is given to the current status of knowledge about the effects of space on man, as well as to methods and materials used to study man's intellectual and physical capabilities in space, his psychological stability, and treatment and defenses of the human organism against the deleterious effects of the space environment. Some functional changes in the basic system of the organism in response to space flight are described, and the physiological mechanisms behind such changes are outlined. A large number of new terms applicable to space medicine are used for the first time. I.H.

A84-48939
RESONANT MICROWAVE ABSORPTION OF SELECTED DNA MOLECULES
G. S. EDWARDS, C. C. DAVIS (Maryland, University, College Park, MD), J. D. SAFFER (National Institutes of Health, National Cancer Institute, Bethesda, MD), and M. L. SWICORD (Food and Drug Administration, Center for Devices and Radiological Health, Rockville, MD) Physical Review Letters (ISSN 0031-9007), vol. 53, Sept. 24, 1984, p. 1284-1287. refs

The resonant absorption of microwave energy by aqueous solutions containing DNA of known length is experimentally demonstrated. The resonances observed have relaxation times of hundreds of picoseconds. Absorption by linear and supercoiled circular DNA molecules is discussed in terms of a mechanism involving microwave excitation of acoustic modes of the double helix. Author

A84-49047
MEMBRANES IN THE EVOLUTION OF LIFE [MEMBRANY V EVOLIUTSII ZHIVOGO]
D. N. OSTROVSKII (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR) Priroda (ISSN 0032-874X), Aug. 1984, p. 14-21. In Russian. refs

The evolution of cell membranes is divided into two stages. The first stages consisted in the complication of the collection of membrane enzymes and receptors to a level characteristic of present bacteria. During the second stage the structure of membranes was simplified and the number of their functions was reduced, with the simultaneous appearance of specialized intracellular structures and the development of cooperation between them. It is suggested that the key role in the appearance of specialized membranes and the development of multicellular organisms was played by endogenous membrane-active compounds capable of causing the individualization of membrane components. It is further suggested that substances of this type are synthesized by bacteria in order to establish intercellular contacts when food near the cell is exhausted. B.J.

A84-49315
BIOSYNTHESIS OF CHEMOAUTOTROPHIC BACTERIA USING ELECTRICAL ENERGY [BIOSINTEZ KHEMOAVTOTROFOV NA OSNOVE ELEKTROENERGII]
B. G. KOVROV and G. V. DENISOV IN: Analysis of population growth by biophysical methods . Novosibirsk, Izdatel'stvo Nauka, 1984, p. 31-40. In Russian. refs

Chemoautotrophic bacteria acquire energy from oxidation reactions of inorganic substrates. In a number of cases (e.g., for Thiobacillus ferrooxidans) it is possible to electrochemically reduce the oxidized substrate Fe(3+) to the initial Fe(2+). The electrochemical reduction occurs directly in the bacteria culture, which grows in the cathodic space of an electrolytic cell. An investigation is made of the range of optimal values of the main parameters of the continuous-cultivation process: temperature, pH, and concentrations of the components of the nutrition medium. A continuous culture is obtained with a concentration up to 5 x 10 to the 11th kl/ml and a biosynthesis efficiency up to 30 percent. B.J.

A84-49324
NEURONAL ORGANIZATION OF THE DEVELOPING BRAIN [NEIRONNAIA ORGANIZATSIIA RAZVIVAIUSHCHEGOSIA MOZGA]
O. V. BOGDANOV and E. G. GEVORGIAN Leningrad, Izdatel'stvo Nauka, 1984, 152 p. In Russian. refs

The results of a systematic investigation of functional regularities in the growth of the central nervous system during the embryonal stage of development are discussed. Consideration is given to the principles of neuronal activity during embryogenesis, the formation of the functional characteristics of the neuronal system in the brain, and the relation between the rise of afferent function and the development of neuronal function. Several different techniques were used in investigations performed with chicken embryos, including microelectrode stimulation, pharmacological analysis, and focal evoked potential methods. I.H.

A84-49338
GENETICOPHYSIOLOGICAL MECHANISMS IN THE REGULATION OF THE FUNCTIONS OF THE TESTES [GENETIKO-FIZIOLOGICHESKIE MEKHANIZMY REGULIATSII FUNKTSII SEMENNIKOV]
E. V. NAUMENKO, A. V. OSADCHUK, L. I. SEROVA, and G. T. SHISHKINA Novosibirsk, Izdatel'stvo Nauka, 1983, 202 p. In Russian. refs

Several basic issues in the study of regulation mechanisms in the testes are discussed. Consideration is given to experimental results from several investigations of the role of neuronal mediators (dopamine, noradrenaline, and serotonin) in the central regulation of the hypophysial-testicular complex, and in the mechanisms of negative feedback. The relative importance of seasonal factors and rhythms is discussed, as well as the role of biosocial

correlations between members of the same animal population. Particular attention is given to an examination of the role of the genotype in the regulation of androgenous functions in various types of behavior. I.H.

A84-49342
INNER FLUIDS OF THE BODY (2ND REVISED AND ENLARGED EDITION) [VNUTRENNIAIA SREDA ORGANIZMA /2ND REVISED AND ENLARGED EDITION/]
G. N. KASSIL Moscow, Izdatel'stvo Nauka, 1983, 225 p. In Russian.

The inner fluids of the body (blood, lymph, and tissue fluids) are examined with respect to their significance for the vital functions of cells, tissues, organs, and the entire body. Also considered are the production processes and mechanisms of these fluids and their role in the performance of physiological and biochemical processes. Particular emphasis is placed on the homeostasis problem, neural-humoral-hormonal-barrier interrelationships, and the effects of stress and pain on the system of inner fluids. Information is presented on the behavior of the inner-fluid system under physical exercise and intense athletic activity. B.J.

A84-49373
MEASUREMENT AND PREDICTION OF THERMAL INJURY IN THE RETINA OF THE RHESUS MONKEY
A. J. WELCH (Texas, University, Austin, TX) and G. D. POLHAMUS (U.S. Army, Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD) IEEE Transactions on Biomedical Engineering (ISSN 0018-9294), vol. BME-31, Oct. 1984, p. 633-644. refs
(Contract F33615-76-C-0605)

The authors measured temperature rises with specially designed microthermocouples in over 60 retinae for various image sizes, wavelengths, adn exposure durations. Measured temperatures varied with a standard error of 6 percent, and agreed well with a mathematical model for temperature-time response. Observed injury also compared favorably to that predicted by a rate process model for thermal injury. Suggested rate constants for the eye are A = 1.3 x 10 to the 99th l/s, and E = 150,000 cal/M. With these coefficients, predicted threshold injury agreed within a factor of two with experimentally determined injury from 10 to the -8th to 10 to the 3rd s. No difference in threshold temperatures was evident between either macular and paramacular exposures or between wave lengths of 488-647 nm. The model can be used to predict injury in the human eye by substituting absorption coefficients and thickness for the human PE and Ch in the thermal portion of the model. Author

A84-49568
THE EFFECT OF HYPERTHERMIA ON THE BODY TEMPERATURE AND THE CATECHOLAMINE CONTENT OF THE HYPOTHALAMUS IN ALBINO RATS [VLIIANIE GIPERTERMII NA TEMPERATURU TELA I SODERZHANIE KATEKHOLAMINOV V GIPOTALAMUSE BELYKH KRYS]
F. F. SULTANOV, KH. A. MEZIDOVA, and B. N. MANUKHIN (Akademiia Nauk Turkmenskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Ashkhabad, Turkmen SSR; Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 5, 1984, p. 1274-1276. In Russian. refs

N84-34117*# National Aeronautics and Space Administration, Washington, D. C.
ULTRASTRUCTURAL ALTERATIONS IN SKELETAL MUSCLE FIBERS OF RATS AFTER EXERCISE
M. AKUZAWA and M. HATAYA Sep. 1982 18 p refs Transl. into ENGLISH from Japanese J. of Veterinary Sci. (Japan), v. 40, 1978 p 425-435 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3199)
(NASA-TM-76976; NAS 1.15:76976) Avail: NTIS HC A02/MF A01 CSCL 06B

Ultrastructural alterations in skeletal muscle fibers were electron microscopically studied in rats forced to run on the treadmill until all-out. When they were mild and limited to relatively small areas, the reconstruction of filaments ensued within 10 days without infiltration of cells. When they were severe and extensive, phagocytes infiltrated in the lesions and removed degenerative sacroplasmic debris from muscle fibers. A little later, myoblasts appeared and regeneration was accomplished in 30 days in much the same manner as in myogenesis. Author

N84-34118# European Space Agency, Paris (France).
PROTEIN SINGLE CRYSTAL GROWTH UNDER LOW GRAVITY
T. D. GUYENNE, ed. and J. J. HUNT, ed. Jun. 1984 79 p refs Proc. of Joint ESA-DFVLR Workshop, Freiburg i. B., 19-20 Mar. 1984
(ESA-SP-1067; ISSN-0379-6566) Avail: NTIS HC A05/MF A01

Application of protein crystals for structure and function analysis; crystallization of the membrane protein rhodopsin; fibrinogen, plasminogen, and tissue-type plasminogen activator roles in the fibrinolytic system; alpha-crustacyanin, the lobster carapace astaxanthin-protein; carbohydrate-protein interactions; protein single crystal growth under microgravity; and diffusion profiles in microgravity protein crystallization experiments on Spacelab were discussed.

N84-34119# Groningen Rijksuniversiteit (Netherlands). Lab. of Chemical Physics.
APPLICATION OF PROTEIN CRYSTALS FOR STRUCTURE AND FUNCTION ANALYSIS
J. DRENTH *In* ESA Protein Single Crystal Growth under Low Gravity p 3-8 Jun. 1984
Avail: NTIS HC A05/MF A01

The study of the enzyme phospholipase A2 is presented as an example of cooperation between biochemists and crystallographers. Crystal structure in and not in solution, X-ray analysis of protein crystals, diffraction patterns, binding of heavy atoms, and radiation damage are discussed. Author (ESA)

N84-34120# Nijmegen Univ. (Netherlands). Dept. of Biochemistry.
CRYSTALLIZATION OF THE MEMBRANE PROTEIN RHODOPSIN
S. L. BONTING, W. J. DEGRIP, and F. J. M. DAEMEN *In* ESA Protein Single Crystal Growth under Low Gravity p 9-13 Jun. 1984 refs
Avail: NTIS HC A05/MF A01

The physiological role and the chemical characteristics of the visual pigment rhodopsin are described and attempts to crystallize this water-insoluble membrane protein are reported. After many variations of precipitant, detergent, buffer and pH, small crystals (100 microns) too small to permit their use for X-ray diffraction studies, were obtained. A method to obtain larger crystals under microgravity conditions in the Eureca protein crystallization facility is summarized. Author (ESA)

N84-34121# Gaubius Inst., Leiden (Netherlands). Health Research Div.
FIBRINOGEN, PLASMINOGEN AND TISSUE-TYPE PLASMINOGEN ACTIVATOR: THEIR ROLE IN THE FIBINOLYTIC SYSTEM
W. NIEUWENHUIZEN, D. C. RIJKEN, and D. W. TRAAS *In* ESA Protein Single Crystal Growth under Low Gravity p 15-17 Jun. 1984 refs
Avail: NTIS HC A05/MF A01

Hemostasis is discussed. Disbalance between clot formation and dissolution can cause thrombotic or bleeding events, depending on which of the two processes predominates. During fibrinolysis, insoluble fibrin is degraded to soluble fragments by plasmin, which can be formed by activation of plasminogen by tissue-type plasminogen activator (t-PA). Fibrin is, however, not merely a plasmin substrate but also accelerates the t-PA mediated plasminogen activation. This acceleration is probably due to mutual interactions between plasminogen, t-PA and fibrin. Knowledge of the three-dimensional structure, obtained by X-ray analysis of crystals of the three proteins, contributes of the understanding of accelerated plasmin formation in the presence of fibrin. Author (ESA)

N84-34122# London Univ. (England). Dept. of Biochemistry.
THE ALPHA-CRUSTACYANIN, THE LOBSTER CARAPACE ASTAXANTHIN-PROTEIN
P. F. ZAGALSKY *In* ESA Protein Single Crystal Growth under Low Gravity p 19-32 Jun. 1984 refs
Avail: NTIS HC A05/MF A01

The astaxanthin protein which provides the blue coloration of lobster carapaces is discussed. The native pigment, alpha crustacyanin, is oligomeric and dissociates at low ionic strength with the formation of a purple derivative, beta-crustacyanin. Eight beta-crustacyanin units are formed on dissociation of alpha-crystacyanin, each binding two astaxanthin molecules. Removal of the carotenoid prosthetic groups results in reversible dissociation of the pigments into apoprotein units of molecular weight 20,000 daltons, half the size of beta-crystacyanin units. The large bathochromic shift in the absorption spectrum of the carotenoid (160 nm) may be the result of polarization of the polyene by suitable charge groups of the protein, or of twisting of the polyene about its double bonds. The manner in which such twisting could be brought about is outlined. Resonance Raman spectroscopy studies, favoring the polarization mechanism for the spectral shift, are discussed. Author (ESA)

N84-34123# Freiburg Univ. (West Germany). Inst. fuer Organische Chemie und Biochemie.
CARBOHYDRATE-PROTEIN INTERACTIONS
J. LEHMANN *In* ESA Protein Single Crystal Growth under Low Gravity p 33-54 Jun. 1984
Avail: NTIS HC A05/MF A01

The chemistry of carbohydrates and proteins is reviewed and typical carbohydrate-protein reactions are described. Antibody-antigen interactions; galactosylation of glycoprotein in serum; protein agglutination of blood cells; and mouse egg fertilization are recalled. Author (ESA)

N84-34124# Freiburg Univ. (West Germany). Chemisches Lab.
PROTEIN SINGLE CRYSTAL GROWTH UNDER MICROGRAVITY
W. LITTKE and C. JOHN *In* ESA Protein Single Crystal Growth under Low Gravity p 55-64 Jun. 1984 refs
Avail: NTIS HC A05/MF A01

Production of single crystals under microgravity conditions on Spacelab is described. Crystals formed by salting out from solutions kept free of convection are 27 and 1000 times larger in volume than those produced in the same apparatus exposed to terrestrial gravitation. Solving the three dimensional molecular structure of proteins by X-ray diffraction analysis reveals its manifold functions (catalysis, transport, supporting functions). An essential condition for such structural investigations is the availibility of sufficiently large (1 mm in each dimension) and well shaped single crystals. Especially disadvantageous for such protein crystal growth is sudden multiseed formation. Instead of the desired few large crystals numerous small crystallites are formed which are useless for X-ray analysis. Experiments show that this effect is mainly due to convection which can be almost completely suppressed by crystallization in gels. Author (ESA)

N84-34125# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
DIFFUSION PROFILES IN MICROGRAVITY PROTEIN CRYSTALLIZATION EXPERIMENTS
A. HAHNE *In* ESA Protein Single Crystal Growth under Low Gravity p 65-70 Jun. 1984 refs
Avail: NTIS HC A05/MF A01

The protein crystallization experiment of the First Spacelab Payload is discussed. The bulk of the precipitated crystals did not occur in the buffer chamber separating protein and salt chamber but in the protein chamber itself. This unexpected location can be explained by the diffusion conditions governing material fluxes under microgravity. Because all parameters necessary to describe the diffusion behavior of the involved substances are not known, assumptions and estimates had to be made concerning diffusion coefficients and flux equations. Nevertheless it can be shown that salt and protein fluxes are different by several orders of magnitude. As a result, the salt penetrates much faster into the buffer and protein chamber than the protein leaves it. Author (ESA)

N84-34126# Illinois Univ., Urbana. Dept. of Psychology.
THE EFFECT OF LESIONS IN THE PREOPTIC-ANTERIOR HYPOTHALAMUS ON THE REFLEXIVE RESPONSES OF RATS TO COLD STRESS Final Report, 7 May 1977 - 30 Jun. 1983
E. SATINOFF 15 Jul. 1984 6 p
(Contract N00014-77-C-0465)
(AD-A144020; AD-E751074; CTR-ONR-8301) Avail: NTIS HC A02/MF A01 CSCL 06P

We have been investigating the hypothalamic control of the generation and maintenance of the circadian temperature rhythm (CTR). Using implanted telemetry devices and automatic drinking measures, we monitored the rhythms of body temperature and drinking in rats before and after various types of hypothalamic damage. When we divided the CTR up into five components - phase, amplitude, limits, precision and period - we found that each component could be affected independent of the others. For instance, after lesions of the suprachiasmatic nuclei, the putative master clock in the brain, the phase was altered so that highest body temperature occurred several hours earlier than it did in normals. The amplitude of the CTR was attenuated in most, but not all lesioned rats, and the limits were lower than normal but shorter than 24 hrs, and the precision of the rhythms (when hourly body temperature rose above the daily mean body temperature) was not as regular. In rats with lesions of the medial preoptic area, the phase and period were normal, but the amplitude of the CTR was greatly exaggerated, as were the limits and the daily mean. In other studies we have shown that the amount of REM sleep is highly dependent on the ambient temperature. After basal forebrain (medial preoptic) lesions, rats that showed no REM sleep at one ambient temperature showed normal amounts at another on the same day. GRA

N84-34127# Research Inst. of National Defence, Umea (Sweden). Dept. 4.
THE STABILITY OF ATROPINE, STORED IN THE SWEDISH AUTOINJECTOR
B. KARLSSON and V. OEGREN Apr. 1984 14 p refs In SWEDISH; ENGLISH summary
(FOA-C-40191-C3; ISSN-0347-2124) Avail: NTIS HC A02/MF A01; Research Institute of National Defence, Stockholm KR 50

The efficiency of stored and newly made atropine/toxogonin mixture, to compete with the traced 3 sub H-QNB (quinuclidinylbenzilate) binding at a muscarinic receptor was compared, giving a measure of the biological activity of atropine. No decreased activity of the atropine is noted after storage in the autoinjector for up to 15 yr. Author (ESA)

N84-34128# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES
6 Sep. 1984 171 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UBB-84-020) Avail: NTIS HC A08/MF A01

The current status of the biomedical, behavioral and life sciences in the Soviet Union is examined. Topics include aerospace medicine and related subjects in biochemistry, biophysics, immunology, terrestrial medicine, pharmacology, and psychology. Agrotechnology, biotechnology, genetics, molecular biology, public health, and virology are also discussed.

N84-34130# Joint Publications Research Service, Arlington, Va.
EFFECTS OF PROLONGED WEIGHTLESSNESS ON ORCHIDACEAE PROTEINS Abstract Only
T. M. CHEREVCHENKO, V. V. SHMIGOVSKAYA, I. V. KOSAKOVSKAYA, and I. I. CHERNYADYEV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-020) p 7 6 Sep. 1984 Transl. into ENGLISH from Dokl. Akad. Nauk Ukr. SSR Ser. B: Geol., Khim. i Biol. Nauki (Kiev), no. 5, May 1984 p 78-80
Avail: NTIS HC A08/MF A01

The effects of long-term weightlessness (up to 6 months) on the electrophoretic mobility of soluble and structural proteins and D-ribulose-1,5-diphosphate carboxylase activity of the family Orchidaceae are studied in the leaves of five species: Epidendrum radicans, Doritis pulcherrima, Haemaria discolor, Paphiopedillum insigne and Physosiphon loddigesii. Prolonged weightlessness induced an increase in the number rapidly-migrating soluble and structural proteins in the case of Epidendrum, Haemaria, and Physosiphon. In Paphiopedillum, the number of rapidly-migrating fractions decreased, and, in Doritis, the number remained essentially unchanged. All changes are reversible. Activities of carboxylase are depressed only in Haemaria and Physosiphon, while the activities in the other species remain refractory to change or actually show an increase (Doritis, Epidendrum) after termination of exposure. Weightlessness significantly affects orchid metabolism, including photosynthesis. M.A.C.

N84-34131# Joint Publications Research Service, Arlington, Va.
GENETIC STUDY OF PLASMID INTEGRATION IN YEAST CHROMOSOMES. REPORT 1: EFFECT OF INTEGRATION OF EPISOMAL PLASMID IN MEIOTIC CROSSOVER IN CHROMOSOME 3 Abstract Only
S. A. BULAT and I. A. ZAKHAROV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-020) p 61 6 Sep. 1984 Transl. into ENGLISH from Genet. (Moscow), v. 20, no. 2, Feb. 1984 p 197-204
Avail: NTIS HC A08/MF A01

The integration of chimeral plasmids into heterological genomes such as those of Saccharomycetes is investigated. The strain used is S. cerevisiae and a related hybrid. A minimum synthetic medium with added amino-acids and nitrogen bases is used for culturing. Clones are sought that contained integrated plasmids with selected instability features, as confirmed by tetrad analysis. Clones with a stable Leu+ trait contain the desired plasmid. Mapping shows that the plasmid integrated at locus leu2 of chromosome three for stable integrants 2-8-7 and 2-8-8 and in an unidentified chromosome in stable 2-8x. The presence of the yeast transposon Tyl in plasmids with the LEU2 gene is taken to indicate random integration. The maps show that plasmid integration in locus leu2 suppresses crossover in the leu-MAT centromer region. M.A.C.

N84-34132# Joint Publications Research Service, Arlington, Va.
GENETIC STUDY OF PLASMID INTEGRATION IN YEAST CHROMOSOMES. REPORT 2: ANALYSIS OF IRREGULAR MEIOTIC SEGREGATION Abstract Only
S. A. BULAT and I. A. ZAKHAROV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-020) p 61-62 6 Sep. 1984 Transl. into ENGLISH from Genet. (Moscow), v. 20, no. 2, Feb. 1984 p 205-211
Avail: NTIS HC A08/MF A01

Saccharomycetes yeast cells are used to determine the role of nonreciprocal recombination on markers of chromosome 3 where plasmid integration has previously taken place. The practical implications for protein production are also assessed. Episomal plasmid pYF91 is used based on bacterial plasmid pBR322 with fragments of yeast DNA containing the LEU-2 gene and the EcoRI-fragment of 2mu DNA (2,4-megadalton). Meiotic segregation is studied in descendents of the stable integrants 2-8-7, 2-8-8 and 2-8x of genotype MATaleu2-3 (with marker LEU2 BLA) of ura3, crossed with strain 88A-D3008 of genotype MATalpha leu2-3 2-112 his 4. One or two segregants are always unstable and the Leu-2+ trait more than 50% of the time. The diploid 2-8xX88A does not show conversion segregation at leu2, has infrequent loss of integrated plasmid material and no homozygotization at the his4 marker. The irregularities of the segregation process are summarized. M.A.C.

N84-34133# Joint Publications Research Service, Arlington, Va.
OBTAINING YEAST VECTOR MARKED BY MUTATION OF MULTIPLE ANTIBIOTIC RESISTANCE Abstract Only
O. V. NEVZGLYADOVA and A. G. SMOLYANITSKIY *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-020) p 62 6 Sep. 1984 Transl. into ENGLISH from Genet. (Moscow), v. 20, no. 2, Feb. 1984 p 212-218
Avail: NTIS HC A08/MF A01

Mutants of Sacch, cerevisiae are produced that have resistance to several antiobiotics at the same time. The Ant(R) mutation and its relationship to 2mu DNA is studied its value as a marker for yeast vector plasmid in its replicative part. The Ant(R) localized using cytoduction and transformation methods. Various MATa and MATalpha genotypes, as well as an E. coli strain yeast vector pJDB219, are studied. The transmission of the Ant(R)-determinants are analyzed in individual heterokaryotic clones. Among some 50 analyzed retransformants obtained by introducing hybrid DNA into the DC-5 strain, eight are resistant to both tested antibiotics, and also show complete correlation between losses of Leu+- and Ant(R)-phenotypes, indicating linking of the Ant- and LEU2-genes. M.A.C.

N84-34152# Geneva Univ. (Switzerland). Inst. of Morphology.
MORPHOMETRIC AND BIOPHYSICAL STUDY OF BONE TISSUE IN IMMOBILIZATION-INDUCED OSTEOPOROSIS IN THE GROWING RAT
D. UEBELHART, J. M. VERY, and C. A. BAUD *In* ESA The Gravity Relevance in Bone Mineralization Processes p 73-78 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

The effects of immobilization by nervous section, to simulate weightlessness, on the bones of growing rats were studied by histomorphometric and biophysical methods. A reduction of compact bone growth, resulting from a decrease of formation, and a decrease of trabecular bone volume, resulting from a decrease of formation and an increase of resorption, are shown. The degree of mineralization of compact bone tissue is low, not associated to an increase of crystallinity index; this characterizes a hypomineralization state. Calcitonin has no effect upon bone formation and mineralization, but decreases resorption of cancellous bone. No changes in crystallographic parameters are detected. Author (ESA)

N84-34153# Brussels Univ. (Belgium). Hopital Erasme.
ANIMAL MODELS OF DISUSE OSTEOPOROSIS
M. VERHAS, M. HINSENKAMP, N. DOUROV, and A. SCHOUTENS *In* ESA The Gravity Relevance in Bone Mineralization Processes p 79-81 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Two animal models of disuse osteoporosis were used to study the modification of calcium loss, bone blood flow, and calcium clearance. In paraplegia, a sustained increase of bone blood flow, a demineralization of the skeleton (more pronounced in the trabecular bone of the epiphyse and metaphyse), clearance of calcium 45 decrease, and a temporary stimulation of bone marrow are noted. The pattern is not modified by an oral administration of indomethacin. In a model of tibial unloading, decrease in bone length on the other limb (overloading tibia) and a diminished bone density and bone calcium load on the unloading side are observed. Author (ESA)

N84-34154# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).
USE OF PRIMATE MODEL IN WEIGHTLESSNESS BONE PHYSIOLOGY: GENERAL PROBLEMS
C. L. MILHAUD, C. NOGUES, and P. C. PESQUIES *In* ESA The Gravity Relevance in Bone Mineralizarion Processes p 83-86 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Problems associated with the use of primates in space, especially to study calcium metabolism, are reviewed. Primate model value advantages include phylogenetic closeness, vertical posture, model versatility, large size, and long restraint period tolerance. Disadvantages include heterogeneity, safety and sedentarity problems, large size, and ethical problems. Selection of species, ground simulations, practical problems associated with flights, experimental requirements, and scientific programs are discussed. Author (ESA)

N84-34155# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).
USE OF PRIMATE MODEL IN WEIGHTLESSNESS BONE PHYSIOLOGY. HISTOLOGICAL APPROACH AFTER ILIAC CREST BIOPSY
C. NOGUES, C. L. MILHAUD, and P. C. PESQUIES *In* ESA The Gravity Relevance in Bone Mineralization Processes p 87-89 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

A biopsy sampling technique in monkeys is described and results obtained under various physiological conditions; including antiorthostatic bedrest are discussed. An incision of 4 cm is performed both on the iliac crest and the anterior line of the pelvis. Tissues are dissected until bone is reached: muscle and superficial periost are spread and the crest is cut. The bone biopsy is 12 mm long on each side and may be divided into 3 parts to be immersed in fixative solutions. After resorption differentiated osteoblasts synthetise osteoid matrix on resorbed surfaces. The amount of newly formed osteoid tissue may be appreciated by measuring its surface section (thus its volume density) and its interface with marrow, giving surface density of osteoid. Information obtained on unstained sections includes distance between cementing line and quiescent bone surface, and calcification rate after labeling with fluorescent markers. Author (ESA)

N84-34910# Hughes Aircraft Co., Long Beach, Calif. Support Systems.
A STUDY OF THE INTERACTION OF MILLIMETER WAVE FIELDS WITH BIOLOGICAL SYSTEMS Final Report
A. LAWRENCE, B. PIERCE, J. MCDANIEL, and D. CHANG Jul. 1984 57 p
(Contract N00014-83-C-0010)
(AD-A144150) Avail: NTIS HC A04/MF A01 CSCL 06R

Our study of the interaction of millimeter wave fields with biological systems has concentrated on Davydov's model of soliton formation in alpha-helices. A qualitative understanding has been obtained for the oscillatory modes of proteins in the millimeter and submillimeter regions of the electromagnetic spectrum. Four separate groups of frequencies are found to exist in short alpha-helices, ranging from 200 gigahertz to 6 terahertz. In long alpha-helices, soliton trapping is predicted for multiquanta excitation at zero temperature, while the existence of solitons at room temperature is called into question. A molecular orbital calculation of the exciton-phonon coupling constant in the formamide dimer suggests that the value of this critical constant still needs to be determined. The results point up the need for further molecular orbital calculations and experimental verification in order to understand the interaction of millimeter waves with biological systems. GRA

N84-34911# Office of Naval Research, London (England).
BIOELECTROMAGNETICS RESEARCH IN WEST GERMANY: AN ASSESSMENT
T. C. ROZZELL 2 Jul. 1984 12 p
(AD-A144297; ONRL-R-9-84) Avail: NTIS HC A02/MF A01 CSCL 06B

This report highlights some of the key research that has been carried out in Germany on millimeter-wave effects during the past 2 to 4 years. In addition, the report examines other bioelectromagnetics research related to biological effects as well as diagnostic and therapeutic applications. Author (GRA)

N84-34912# Office of Naval Research, London (England).
BIOELECTROMAGNETICS RESEARCH IN FRANCE: AN ASSESSMENT
T. C. ROZZELL 29 Jun. 1984 14 p
(AD-A144305; ONRL-R-8-84) Avail: NTIS HC A02/MF A01 CSCL 06R

Over the past decade, France has played a major research role in bioelectromagnetics (BEM) (studies of the interaction of electromagnetic fields with biological systems). While the total French program was moderate compared with those of other countries, the contributions it made were highly significant and had an impact on almost every area of the field. This report examines recently completed BEM research and discusses some work done over the past 3 to 5 years. GRA

N84-35053# National Taiwan Univ., Taipei.
APPLICATION OF COMPARTMENTALIZATION/AIR LOCK OF SIMULATED PRESSURIZED AIRCRAFT AND TOLERANCE OF LUNG TO RAPID DECOMPRESSION IN DIFFERENT LABORATORY ANIMALS Abstract Only
H. S. FANG *In* National Science Council Sci. Res. Abstr. in Republic of China, 1983 p 100 Jun. 1984
Avail: Issuing Activity

The incidence of pulmonary hemorrhage of different laboratory animals undergoing rapid decompression is markedly decreased by using compartmentalization/air lock of simulated pressurized aircraft. In protected rabbits, mice and rats, 6 of 24(25%), 7 of 24(29%) and 6 of 24 lungs(255) exhibited a few petechial hemorrhages respectively following rapid decompression. In unprotected animals all lungs showed slight to very severe degrees of decompression-induced hemorrhages. The difference in incidence of such hemorrhages between protected and unprotected animals is statistically significant. The mortality percentage of the unprotected animals undergoing rapid decompression is 47%, with no deaths in protected animals. As far as the incidence of such pulmonary hemorrhages and the mortality of experimental animals are concerned, the present results indicate that the application of the compartmentalization combined with adequate air lock will be of great value in protection against accidental decompression of pressurized aircraft. M.A.C.

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A84-46532
ON THE PROBLEM OF THE SPECIFICITY OF RESPONSES OF HEART RHYTHM TO CERTAIN TYPES OF MENTAL TASK LOAD [K VOPROSU O SPETSIFICHNOSTI REAKTSII SERDECHNOGO RITMA NA NEKOTORYE VIDY UMSTVENNOI NAGRUZKI]
V. V. ROMANOV, N. I. LEVINSKII, and I. N. CHERNOVA (Kalininskii Politekhnicheskii Institut, Kalinin, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 563-568. In Russian. refs

The dual-task method was used to evaluate the question of the autonomic response specificity of heart rhythm to mental task load in 15 healthy male subjects. The results fail to confirm the hypothesis of the specificity of cardiovascular-system responses to the preferential perception of external signals and the solution of mental problems. Instead, only relatively stable individual response features, associated with the personality characteristics of the subjects, were observed. B.J.

A84-46533
PHENOMENON OF THE FALSE LOCALIZATION OF A VISUAL IMAGE AND THE FUNCTIONAL ASYMMETRY OF THE HUMAN BRAIN [FENOMEN LOZHNOI LOKALIZATSII ZRITEL'NOGO OBRAZA I FUNKTSIONAL'NAIA ASIMMETRIIA MOZGA CHELOVEKA]
V. N. IARLYKOV (Leningradskii Pediatricheskii Meditsinskii Institut, Leningrad, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 573-577. In Russian. refs

A tachistoscope was used to study vertical-line localization in the right and left semifields of vision. The false localization of the visual image was found to be asymmetric: it was remarked only when the stimulus was presented in the right semifield. This asymmetry points to the anisotropic character of the visual space, i.e., to the nonequivalence of the right and left parts of this space for a healthy human. It is noted that this phenomenon can be explained by the simultaneous use of different strategies by the two brain hemispheres: the left hemisphere is 'careful' while the right hemisphere takes 'risks'. B.J.

A84-46534
TRAINING OF THE VESTIBULAR STABILITY OF STUDENTS IN PHYSICAL-EDUCATION CLASSES [TSELENAPRAVLENNAIA TRENIROVKA VESTIBULIARNOI USTOICHIVOSTI STUDENTOV V PROTSESSE ZANIATII PO FIZICHESKOMY VOSPITANIIU]
V. V. SHEVTSOV (Tiumenskii Gosudarstvennyi Universitet, Tyumen, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 589-593. In Russian. refs

The paper examines methods for enhancing the vestibular stability of students in physical-education classes. It is shown that the utilization of exercises having an effect on the vestibular apparatus makes somatic, sensory, and vegetative responses less pronounced. The vestibular-related exercises also lead to the development of habits relating to the performance of activities on the background of the stimulation of the vestibular analyzer. The process of motion control is also improved. B.J.

A84-46535
PATTERN OF EXTERNAL BREATHING AND GAS EXCHANGE DURING THE COMBINED EFFECT OF HYPOXIA AND HYPERCAPNIA ON THE BODY [DINAMIKA VNESHNEGO DYKHANIIA I GAZOOBMENA PRI KOMBINIROVANNOM VOZDEISTVII NA ORGANIZM GIPOKSII I GIPERKAPNII]
N. A. AGADZHANIAN, L. KH. BRAGIN, G. A. DAVYDOV, and IU. A. SPASSKII Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 610-616. In Russian. refs

Data on optimal combinations of hypoxia and hypercapnia pertaining to a prolonged stay in a rarefied atmosphere were obtained from investigations conducted on eight males. It is shown that changes of a number of physiological indicators under the effect of hypercapnia in various periods of high-altitude adaptation in conditions of rest are preserved even during light physical exercise. Three-week adaptation to high-altitude conditions is accompanied by a number of physiological shifts, leading to an improved tolerance of high concentrations of CO2 (up to 38 mm Hg). B.J.

A84-46536
INVESTIGATION OF THE RESPIRATION, HEMODYNAMICS, CARDIODYNAMICS, AND OXYGEN REGIMES IN ATHLETES IN MOUNTAIN CONDITIONS [ISSLEDOVANIE DYKHANIIA, GEMO-I KARDIODINAMIKI, KISLORODNYKH REZHIMOV ORGANIZMA U SPORTSMENOV V GORAKH]
M. M. FILIPPOV, M. T. KEREFOV, L. B. DOLOMAN, and V. I. MUDRIK (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 617-622. In Russian. refs

It is shown that the external-breathing function of athletes improved as they ascended to a height of 3500 m; however, the necessary rate of oxygen supply was not reached, which led to a decrease in total oxygen consumption. Compared with mountain inhabitants, the athletes evidenced less optimal regimes of external breathing and blood circulation, and a lower efficiency of oxygen regimes. A low PO2 of mixed venous blood, a pH shift, a greater deficit of buffer bases, and an acid-base imbalance of the blood were observed in the athletes at 3500 m. This indicates the commencement of secondary tissue hypoxia. B.J.

A84-46537
FACTORS DETERMINING THE EFFICIENCY OF THE VOLUNTARY REDUCTION OF VENTILATION DURING MUSCULAR WORK USING INSTRUMENTED FEEDBACK [FAKTORY, OPREDELIAIUSHCHIE EFFEKTIVNOST' PROIZVOL'NOGO SNIZHENIIA VENTILIATSII PRI MYSHECHNOI RABOTE S ISPOL'ZOVANIEM INSTRUMENTAL'NOI OBRATNOI SVIAZI]
S. N. KUCHKIN (Volgogradskii Institut Fizicheskoi Kul'tury, Volgograd, USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 623-630. In Russian. refs

Experiments were conducted on eight subjects, 17-18 years of age. It is shown that a voluntary reduction of the level of ventilation under increasing muscular loads can be achieved through instrumented feedback in the range of 60-80 percent of the reference level and is limited by the imperative breathing stimulus (due mainly to progressive hypercapnia). The efficiency of the voluntary reduction is shown to depend on three factors: (1) the type of working hyperpnea according to the pattern of P(A)CO2 under increasing loads; (2) the basal type of breathing pattern; and (3) the degree to which the habit of voluntary control of breathing has been learned. B.J.

A84-46538
EFFECT OF GEOMAGNETIC DISTURBANCES ON THE CONDITIONS OF CARDIOVASCULAR FUNCTIONS IN ATHLETES [VLIIANIE GEOMAGNITNYKH VOZMUSHCHENII NA SOSTOIANIE SERDECHNO-SOSUDISTYKH FUNKSII U SPORTSMENOV]
G. V. RYZHIKOV and T. D. DZHEBRAILOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow; USSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 640-646. In Russian. refs

Experiments were conducted to study the effect of geomagnetic disturbances on the performance of archers (11 males 20-30 years of age) during training and competition and on the cardiovascular functions of these athletes. A decline of performance was observed on magnetically disturbed days; the archers were divided into those resistant to magnetic disturbances and those nonresistant to such disturbances on the basis of the degree of performance decrease. Those athletes were found to be resistant to the geomagnetic disturbances who were characterized by an increase of sympathetic effects on cardiac activity. An increase in parasympathetic effects was characteristic for athletes with a more or less pronounced decline in performance. B.J.

A84-46539
RENIN-ANGIOTENSION-ALDOSTERONE SYSTEM AND ADAPTATION OF THE ORGANISM TO STRESS IN OLD AGE [RENIN-ANGIOTENZIN-AL'DOSTERONOVAIA SISTEMA I ADAPTATSIIA ORGANIZMA K STRESSU V STAROSTI]
O. V. KORKUSHKO and M. I. ASINOVA (Akademiia Meditsinskikh Nauk SSSR, Kiev, Ukrainian SSR) Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 655-658. In Russian. refs

Stress in young (20-29 years of age) and old (60-74 years of age) people was studied by using physical loads of submaximal intensity and intramuscular administration of adrenalin at a dose of 0.007-0.008 mg/kg of body mass. The activity of renin and the concentration of aldosterone in the blood plasma were assessed by the radio-immune technique. Activation of the renin-angiotensin-aldosterone (RAA) system was observed in the old people during low-intensity loading. In the young people, however, the administration of the adrenaline and standard physical loading (90 W) did not produce significant changes in renin activity and aldosterone concentration in the blood plasma. At the same time, the submaximal physical load produced a more significant activation of the RAA system in young people, which indicates that the aging process is characterized by a decrease in the response capacity of the humoral mechanism considered and a decline in the reliability of this mechanism in stress situations. B.J.

A84-46540
HYPERBARIC PHYSIOLOGY (CURRENT STATUS AND FUTURE PROSPECTS) [GIPERBARICHESKAIA FIZIOLOGIIA /SOSTOIANIE I PERSPEKTIVY/]
G. L. ZALTSMAN Fiziologiia Cheloveka (ISSN 0131-1646), vol. 10, July-Aug. 1984, p. 659-673. In Russian. refs

A description is given of human physiology in a hyperbaric environment, and attention is paid to the effects of hyperbaric environments on physiological processes and structures of the human body, to the physiological foundations for the mastering of hyperbaric environments, to the effects of hyperbaric environments on pathological processes, and to therapeutic applications of hyperbaric environments. Tables enumerating extremal factors of hyperbaric environments and corresponding adaptive and pathological reactions are given. B.J.

A84-46808#
THE FIELD TREATMENT OF HYPOTHERMIA
J. R. POPPLOW and L. A. KUEHN (Department of National Defence, Ottawa, Canada) (Canadian Aeronautics and Space Institute, Annual General Meeting, 31st, Ottawa, Canada, May 28, 1984) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 30, June 1984, p. 114-119. refs

Data from unpublished human hypothermic rewarming experiments as well as literature information has been compiled to provide advice to initial rescuers of hypothermic victims. Blanket insulation in a warm room or vehicle provides 0.5 to 1.0 C/hr core rewarming. This rate is comparable to that achieved using a radiation heat cradle, hot water showers, electric blanket or respiratory warming and is usually available in the field to every rescuer. Medical care teams should be advised to check the airway and respiration and begin respiratory assistance immediately, if necessary. If the victim is unconscious, very cold to touch, with no detectable heart beat, external cardiac massage should not be started immediately, since it may precipitate an irreversible fibrillation and very little will be achieved if the core temperature is 30 C or below. If sinus rhythm has not returned when the deep body temperature reaches 30 C, defibrillation may then be attempted, or cardiac massage instituted. Author

A84-46809#
CONTACT LENSES AND OTHER OPHTHALMIC INNOVATIONS AND THEIR RELATIONSHIP TO THE FLIGHT ENVIRONMENT
L. G. HART (Canadian Aeronautics and Space Institute, Annual General Meeting, 31st, Ottawa, Canada, May 28, 1984) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 30, June 1984, p. 120-127. refs

A84-47496
SEA SICKNESS [MORSKAIA BOLEZN']
V. N. BARNATSKII Moscow, Izdatel'stvo Meditsina, 1983, 144 p. In Russian. refs

Consideration is given to the clinical characteristics, prophylaxis and treatment of various forms of sea sickness which occur under conditions of strong sustained (many-day) ocean storms, as well as during short passages on small boats in coastal regions. A critical analysis is made of existing theories on the etiology and pathogenesis of sea sickness, and methods for the treatment of various forms of motion sickness (nausea occurring as a result of using various forms of transportation) are reviewed. I.H.

A84-47499
BASIC INSTRUMENTAL METHODS FOR THE STUDY OF THE HEART [OSNOVNYE INSTRUMENTAL'NYE METODY ISSLEDOVANIIA SERDTSA]
IA. M. MILOSLAVSKII, D. K. KHODZHAEVA, A. I. NEFEDOVA, and V. N. OSLOPOV Kazan, Izdatel'stvo Kazanskogo Universiteta, 1983, 144 p. In Russian. refs

An instructional manual on instruments for cardiac care is presented which is intended for medical students and professors. Particular attention is given to electrocardiography as the principal electrocardiological method for studying heart functions. Basic operational characteristics of vectorcardiography, phonocardiography, sphygmography and polycardiography are described. The role of rheographs in the study of the central and peripheral hemodynamics of the heart is described, and the function of electrocardiographs in the visualization of changes in heart structure is also described. Several diagrams of the instruments are provided, as well as sample electrocardiograms and sample echocardiograms. I.H.

A84-47999
CLINICAL-PHYSIOLOGICAL POSSIBILITIES OF PREDICTING THE COURSE OF ISCHEMIC HEART DISEASE [KLINIKO-FIZIOLOGICHESKIE VOZMOZHNOSTI PROGNOZIROVANIIA TECHENIIA ISHEMICHESKOI BOLEZNI SERDTSA]
V. S. SHAGINIAN Akademiia Nauk Gruzinskoi SSR, Soobshcheniia (ISSN 0132-1447), vol. 113, March 1984, p. 625-628. In Russian. refs

An attempt is made to derive optimization criteria for the hemodynamic productivity of the heart with reference to the prediction of the course of ischemic heart disease; the study involved the clinical investigation of 70 patients with ischemic heart disease 38 to 78 years of age and a control group of 25 healthy persons of the same age. It is shown that the negative balance of the effective part of the preloading and postloading of the cardiac ventricles, particularly pronounced in patients with a lethal outcome, makes it possible to predict the course of ischemic heart disease and to avert the deterioration of the patient's state. B.J.

A84-48042
THE DOSE-DEPENDENCE OF THE YIELD OF CHROMOSOME ABERRATIONS IN HUMAN LYMPHOCYTES FOLLOWING IRRADIATION OF PERIPHERAL BLOOD WITH MONOENERGETIC NEUTRONS OF 2, 4, AND 6 MEV [ZAVISIMOST' VYKHODA ABERRATSII KHROMOSOM OT DOZY PRI OBLUCHENII LIMFOTSITOV PERIFERICHESKOI KROVI CHELOVEKA MONOENERGETICHESKIMI NEITRONAMI S ENERGIEI 2, 4 I 6 MEV]
A. V. SEVANKAEV, G. M. OBATUROV, V. A. NASONOVA, and N. N. IZMAILOVA (Akademiia Meditsinskikh Nauk SSSR, Obninsk, USSR) Radiobiologiia (ISSN 0033-8192), vol. 24, July-Aug. 1984, p. 531-533. In Russian. refs

A84-48537* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PHYSIOLOGICAL RESPONSES TO PROLONGED BED REST AND FLUID IMMERSION IN HUMANS
J. E. GREENLEAF (NASA, Ames Research Center, Laboratory for Human Environmental Physiology, Moffett Field, CA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Sept. 1984, p. 619-633. refs

For many centuries, physicians have used prolonged rest in bed and immersion in water in the treatment of ailments and disease. Both treatments have positive remedial effects. However, adverse physiological responses become evident when patients return to their normal daily activities. The present investigation is concerned with an analysis of the physiological changes during bed rest and the effects produced by water immersion. It is found that abrupt changes in body position related to bed rest cause acute changes in fluid compartment volumes. Attention is given to fluid shifts and body composition, renal function and diuresis, calcium and phosphorus metabolism, and orthostatic tolerance. In a discussion of water immersion, fluid shifts are considered along with cardiovascular-respiratory responses, renal function, and natriuretic and diuretic factors. G.R.

A84-48859
RETINAL VERSUS EXTRARETINAL INFLUENCES IN FLASH LOCALIZATION DURING SACCADIC EYE MOVEMENTS IN THE PRESENCE OF A VISIBLE BACKGROUND
J. K. OREGAN (CNRS, Paris, France) Perception and Psychophysics (ISSN 0031-5117), vol. 36, no. 1, July 1984, p. 1-14. refs

Four experiments examined the relative use of retinal and extraretinal information in judging the location of a stimulus flash presented under normal lighting conditions in the temporal vicinity of an eye saccade. Two previous studies done under normal lighting conditions (Bischof and Kramer, 1968, and Mateeff, 1978) had hypothesized strong use of extraretinal information. The present study reexamined this work and showed that, in fact, two kinds of retinal effects had been neglected in these studies, and that these alone probably suffice to explain the results. The first retinal effect is related to differences between the response of the visual system to foveal and peripheral stimuli, and may be active even in the dark. The second retinal effect is related to the fact that smearing of the retinal image of the background occurs when the eye moves. Author

A84-48860
EYE-POSITION SIGNALS IN SUCCESSIVE SACCADES
H. HONDA (Niigata University, Niigata, Japan) Perception and Psychophysics (ISSN 0031-5117), vol. 36, no. 1, July 1984, p. 15-20. refs

Accuracy of the eye-position signal (EPS) in successive-saccade conditions was examined by analyzing the subject's performance in tracking his gaze by pointing with his unobservable hand in the dark. The size of constant error in manual pointing was found to increase with the number of the component saccades and to be inversely proportional to the size of the largest component saccade. The results are interpreted as showing that, in successive-saccade conditions, subjects are not able to use the sum of EPSs from each component saccade, but rather use only the EPS from the largest component saccade. Author

A84-49040
PHYSIOLOGICAL FEATURES CHARACTERIZING HUMAN READAPTATION TO HIGH TEMPERATURE [FIZIOLOGICHESKIE OSOBENNOSTI READAPTATSII CHELOVEKA K VYSOKOI TEMPERATURE]
V. P. KOVALENKO and Z. K. SULIMO-SAMUILLO Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1984, p. 40-42. In Russian. refs

An experiment was conducted to assess to what degree individuals preadapted to high temperature in a heat chamber are capable of retaining the acquired complex of adaptive reactions for a specified period after the adaptation. Ten volunteers 18 to 20 years of age were exposed to a temperature of 42 C, a relative humidity of 47-50 percent, and an air velocity of 0.6 m/s for five days, six hours daily. Results indicate that the preadaptation procedure used makes it possible to condition individuals intending to work in a hot climate. B.J.

A84-49041
FEATURES CHARACTERIZING ENDOCRINE FUNCTIONS AND LIPIP METABOLISM IN FLIGHT PERSONNEL [O NEKOTORYKH OSOBENNOSTIAKH ENDOKRINNYKH FUNKTSII I LIPIDNOGO OBMENA U LITS LETNOGO SOSTAVA]
R. V. BELEDA, E. E. NIKOLAEVSKII, and V. V. CHUNTUL Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1984, p. 43, 44. In Russian.

An effort was made to assess the possibility of the early, preclinical diagnosis of ischemic heart disease (IHD) in flight personnel on the basis of radio-immunological and biochemical studies of endocrine functions and lipid metabolism. It is shown that endocrine shifts in flight personnel occupy an intermediate stage between such shifts in healthy individuals and in individuals with IHD. The plasma lipid concentrations in flight personnel are similar to concentrations in patients with IHD. It is concluded that a combination of radio-immunological and biochemical methods is an effective way to diagnose metabolic disorders in flight personnel. B.J.

A84-49042
INDIVIDUAL CHARACTERISTICS OF CIRCADIAN RHYTHMS AND THE WORK CAPACITY OF SEAMEN AT NIGHT [INDIVIDUAL'NYE OSOBENNOSTI TSIRKADNYKH RITMOV I RABOTOSPOSOBNOST' MORIAKOV V NOCHNOE VREMIA]
V. V. BERDYSHEV and G. F. GRIGORENKO Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), July 1984, p. 45, 46. In Russian.

A84-49334
THE CARDIOVASCULAR SYSTEM IN EXTREME NATURAL CONDITIONS [SERDECHNO-SOSUDISTAIA SISTEMA V EKSTREMAL'NYKH PRIRODNYKH USLOVIIAKH]
M. M. MIRRAKHIMOVA, ED. Frunze, Kirgiz SSR, Izdatel'stvo Ilim, 1983, 131 p. In Russian. No individual items are abstracted in this volume.

Papers are presented on the features characterizing the functioning of the human cardiovascular system in high-altitude regions, the Arctic, arid regions, hot climates, and sea climates. Attention is given to mechanisms for the adaptation of the blood-circulation system to these extreme conditions. B.J.

A84-49450* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPACE MEDICINE
P. C. JOHNSON, JR. (NASA, Johnson Space Center, Medical Research Branch; Baylor University, Colege of Medicine, Houston, TX) American Scientist (ISSN 0003-0996), vol. 72, Sept.-Oct. 1984, p. 495-497. refs

The medical aspects of space flight are briefly discussed. The problems of space adaptation syndrome, commonly known as space sickness, are described, and its cause is shown. The adaptation of the cardiovascular system to weightlessness, the problems of radiation in space, atrophy of bones and muscles, and loss of blood volume are addressed. The difficulties associated with the reexperience of gravity on return to earth are briefly considered. C.D.

N84-34129# Joint Publications Research Service, Arlington, Va.
PHYSICAL TRAINING OF COSMONAUTS FOR INTERCOSMOS PROGRAM MISSIONS
A. V. SEDOV and A. S. SUVOROV *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-020) p 1-6 6 Sep. 1984 refs Transl. into ENGLISH from Teoriya i Prakt. Fiz. Kultury (Moscow), no. 4, Apr. 1984 p 22-24
Avail: NTIS HC A08/MF A01

The preflight physical training of cosmonauts is examined as well as the physiological adaptation to the space environment. Experiments include work capacity, circulation, respiration, and exercises developed to increase the reserve capabilities of the cosmonauts M.A.C.

N84-34134# Army Intelligence and Threat Analysis Center, Arlington, Va.
MILITARY MEDICAL JOURNAL, NO. 4, 1984
Apr. 1984 133 p refs Transl. into ENGLISH of Voyenno-Med. Zh. (Moscow), no. 4, Apr. 1984
(L-2718) Avail: NTIS HC A07/MF A01

Progress, research, and application in military medicine is reported. Topics included: epidemiology, diagnoses, toxicology, climate, environmental effects, psychological effects, military personnel and exposure to different environments.

N84-34135# Army Intelligence and Threat Analysis Center, Arlington, Va.
PHYSIOLOGICAL-HYGIENIC CRITERIA OF MEDICAL SELECTION OF MILITARY SERVICEMENT FOR WORK IN A HOT CLIMATE
Y. A. IVANOV *In its* Mil. Med. J., No. 4, 1984 p 56-60 Apr. 1984 Transl. into ENGLISH from Voyenno-Med. Zh. (Moscow), no. 4, 1984 p 42-44
Avail: NTIS HC A07/MF A01

Identical heat tolerance of military personnal which is an important condition to preserve the health of military servicemen and to maintain effective and reliable actions in a hot climate is discussed. Heat adaptation can be increased in different ways by natural adaptation to heat or by artificial adaptation, specific adaptation in heat chambers. Such adaptation is subject to control and the time during which the necessary resistance to heat forms is determined. Nonspecific artificial heat adaptation is obtained by dosage of repeated physical loads and drugs. Identical high resistant to heat in all members of a collective cannot be guaranteed by use of the existing method for individual heat adaptation. In the adaptation process, heterogeniety of the collective relative to the indices of resistance to heat can increase. E.A.K.

N84-34136# Army Intelligence and Threat Analysis Center, Arlington, Va.
MEDICAL-PSYCHOLOGICAL PROBLEMS OF THE OCCUPATIONAL RELIABILITY OF FLIGHT PERSONNEL
V. A. BODROV *In its* Mil. Med. J., No. 4, 1984 p 61-65 Apr. 1984 refs Transl. into ENGLISH from Voyenno-Med. Zh. (Moscow), no. 4, 1984 p 45-47
Avail: NTIS HC A07/MF A01

Pilot reliability which depends on error-free pilot actions to achieve a specific goal in a certain way in interaction between equipment, crew members, and personnel of the flight supervisory group is discussed. Faulty actions is seen as the main indicator of pilot reliability. An important way to improve flight safety is to study the causes of bad pilot judgement. Some pilot errors are caused by an initial or latent form of illness, fatigue, or neuroemotional disorders, and a reduction in functional potentials of the body which are not job related. Aviation physicians have to identify and study the causes of errors. As a rule, in such cases errors are made by pilots who have performed successfully flight assignments of similar complexity before the incident. The physician's effectiveness in the study of erroneous actions depends on his knowledge of theoretical and methodological principles. E.A.K.

N84-34137# Army Intelligence and Threat Analysis Center, Arlington, Va.
THE FUNCTIONAL CONDITION OF SEAMEN UNDER CONDITIONS OF THE SOUTHERN MARITIME AREA
V. V. BERDYSHEV *In its* Mil. Med. J., No. 4, 1984 p 66-72 Apr. 1984 Transl. into ENGLISH from Voyenno-Med. Zh. (Moscow), no. 4, 1984 p 48-51 Original language document was announced as A84-36596
Avail: NTIS HC A07/MF A01

Physiological functional indicators are analyzed for seamen 18 to 25 years of age on a tropical coast for the period between voyages. Indirect indicators of work capacity and CNS functions, indicators of nonspecific resistance and vitamin excretion, and indicators of metabolite excretion in the urine are emphasized. The results are related to fatigue and recovery processes and to the dynamics of adaptation and readaptation. Author

N84-34138# European Space Agency, Paris (France).
THE GRAVITY RELEVANCE IN BONE MINERALIZATION PROCESSES
N. LONGDON, comp. and O. MELITA, comp. Jul. 1984 106 p refs Partly in ENGLISH and FRENCH Proc. of ESA Workshop, Brussels, 18-20 Jan. 1984; sponsored by ESA and Brussels Univ. (ESA-SP-203; ISSN-0379-6566) Avail: NTIS HC A06/MF A01

Froude's number and the thickness of bones during growth; bone changes in acutely immobilized patients; computed tomography in assessing space flight induced bone loss; evaluation of bone mineral content; urinary excretion of hydroxylysyl glycosides as an index of bone metabolism; collagen and noncollagenous proteins in bone particles fractionated by gradient density fractionation; Wolff's law and the adaptation of bone to microgravity; mechanochemical effects in demineralization and mineralization of bone; mechanical force and cartilage metabolism; the gravity relevance on bone stresses by in vivo measurements; an electrochemical hypothesis of bone demineralization in weightlessness; electret effects on fractures; sensitivity of bone cell populations to weightlessness and simulated weightlessness; morphometric and biophysical study of bone tissue in immobilization-induced osteoporosis in the growing rat; animal models of disuse osteoporosis; primate models in weightlessness bone physiology; and glycosaminoglycans in fetal bone mineralization were discussed.

N84-34139# Technische Hogeschool, Eindhoven (Netherlands).
ON FROUDE'S NUMBER AND THE THICKNESS OF BONES DURING GROWTH
C. J. SNIJDERS *In* ESA The Gravity Relevance in Bone Mineralization Processes p 3-6 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Relations according to which the magnitudes load, form and areas of load bearing cross sections, modulus of elasticity, and dynamic quantities remain attuned to each other during growth are outlined. It is shown that the dimensionless quotient formed by Froude's number and by the quantity strain remain constant during growth, using data on maximum walking speed and an observation regarding impact. A law of scale concerning the thickness of vertebrae during growth is given. Author (ESA)

N84-34140# Hopital Bellevue Saint Etienne (France). Dept. de Readaptation Medicale.
BONE CHANGES IN ACUTELY IMMOBILIZED PATIENTS: RESULTS AND PERSPECTIVES
P. MINAIRE *In* ESA The Gravity Relevance in Bone Mineralization Processes p 7-10 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

The results of clinical observations and experimental studies of the effects of immobilization on bone are presented. Their relevance to the effects of weightlessness is emphasized. The perspectives of biological and physiological research are outlined. A loss of 1% to 2% of body calcium per month is revealed by bedrest studies. A reversal of the loss during the first 6 to 9 months is possible, but after this results suggest a new bone balance rather than a return to the status quo. Old people lose relatively less bone than adolescents. Author (ESA)

N84-34141# Eidgenoessische Technische Hochschule, Zurich (Switzerland). Inst. for Biomedical Engineering.
THE POTENTIAL OF LOW DOSE COMPUTED TOMOGRAPHY IN ASSESSING SPACE FLIGHT INDUCED BONE LOSS
P. RUEEGSEGGER and M. DAMBACHER *In* ESA The Gravity Relevance in Bone Mineralization Processes p 11-14 Jul. 1984 refs Prepared in cooperation with Zurich University Hospital
(Contract SNSF-3.998.78; SNSF-3.802.82)
Avail: NTIS HC A06/MF A01

In order to study weightlessness effects on bone loss, high precision pre and post flight bone evaluations with a special purpose low dose computer tomography system and studies of the calcium regulating hormones during flight are proposed. Studies with low dose quantitative/computed/tomography show its potential for assessing space flight induced bone loss. Author (ESA)

N84-34142# Brussels Univ. (Belgium). Hopital Erasme.
CURRENT METHODS OF EVALUATION OF BONE MINERAL CONTENT
S. ELBANNA (Centre Hospitalier de Montigny le Tilleul, Belgium), A. SCHOUTENS, G. SPIEGL, J. DAGNELIE, and M. COLLARD (Centre Hospitalier de Montigny le Tilleul, Belgium) *In* ESA The Gravity Relevance in Bone Mineralization Processes p 15-19 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Invasive and noninvasive techniques which provide a sequential assessment of bone mass, in order to diagnose bone disease; monitor the course of bone changes with disease progression; and monitor the course of bone changes with therapy are reviewed. Radiographic techniques lack the sensitivity required for quantifying levels of change, associated with the development of pathological conditions. Radiogrammetry is relatively precise but not necessarily indicative of the axial bone changes. Photon absorptiometric techniques using single or dual energy sources offer a highly quantitative and precise means of determining the bone mineral content in appendicular and axial skeleton and therefore a better appraisal of early osteoporotic changes. Computed tomography offers advantages, but it is not widespread, for technical and economic reasons. Compton scattering and the total neutron activation technique give more precise determinations of either bone density or body calcium. Author (ESA)

N84-34143# Brussels Univ. (Belgium). Hopital Erasme.
URINARY EXCRETION OF HYDROXYLYSYL GLYCOSIDES AS AN INDEX OF BONE METABOLISM
R. ASKENASI *In* ESA The Gravity Relevance in Bone Mineralization Processes p 21-22 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Hydroxylysyl glycosides were measured in urine with an aminoacid analyzer in order to study the bone collagen metabolism. The main source of hydroxylysyl glycosides in urine must be collagen. As gal-hyl indicate the bone origin of collagen degradation, its measurement in urine could constitute a tool in the study of collagen breakdown during actual and simulated space flight. Author (ESA)

N84-34144# Katholieke Universiteit te Leuven (Belgium). Arthritis and Metabolic Bone Disease Research Lab.
ANALYSIS OF COLLAGEN AND NONCOLLAGENOUS PROTEINS IN BONE PARTICLES FRACTIONATED BY GRADIENT DENSITY FRACTIONATION
J. M. MBUYI-MUAMBA, J. DEQUEKER, and G. GEVERS *In* ESA The Gravity Relevance in Bone Mineralization Processes p 23-28 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Density gradient fractionation of bone powder was used to obtain information on the degree of mineralization of bone fractions under normal and pathological conditions in order to study age effects. Isolated bone fractions were analyzed for their collagen and noncollagenous components content. Results show that the density gradient fractionation technique is suitable for detecting different stages of mineralization in normal and pathological conditions. The chemical analyses of fractionated bone disclose matrix changes similar to those found in studies of age-related changes of bone matrix. Author (ESA)

N84-34145# Cologne Univ. (West Germany). Inst. fuer Anatomisches.
THE SO-CALLED WOLFF'S LAW AND THE ADAPTATION OF BONE TO MICROGRAVITY
B. KUMMER *In* ESA The Gravity Relevance in Bone Mineralization Processes p 29-34 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Pauwel's theory on the functional adaptation of bone was used to derive a computer model to simulate bone remodeling according to Wolff's law. In the model, high stresses cause bone formation, low stresses lead to resorption. An upper tolerance limit of stresses is probable. Stresses above this limit cause pathological bone resorption. Adaptation to extreme microgravity includes therefore the danger that the skeleton might be destroyed by chronic overloading after sudden return to terrestrial gravity. Author (ESA)

N84-34146# Lausanne Univ. (Switzerland). Inst. de Physique Experimentale.
MECHANOCHEMICAL EFFECTS IN DEMINERALIZATION AND MINERALIZATION OF BONE
S. G. STEINEMANN *In* ESA The Gravity Relevance in Bone Mineralization Processes p 35-42 Jul. 1984 refs Prepared in cooperation with Institut Straumann
Avail: NTIS HC A06/MF A01

Using bio-energetics, it is postulated that the mechanical stimulus is part of an overall energy metabolism of calcified tissue; and that a direct link exists between the stimulus and the solubility concept for mineral turnover. Thus, the mechanical influences are treated on the same footing as hormonal and nutritional factors which control bone cell function and remodeling. The thermodynamic approach explains the time factor in the mechanical stimulus and numerical application shows considerable changes in free energy and equilibrium constants for phosphate solubility due to stress. Author (ESA)

N84-34147# Amsterdam Univ. (Netherlands). Dept. of Oral Cell Biology.
MECHANICAL FORCE AND CARTILAGE METABOLISM
J. P. VELDHUIJZEN and G. P. VANKAMPEN *In* ESA The Gravity Relevance in Bone Mineralization Processes p 43-46 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

Changes in the amount and in the properties of proteoglycans in the matrix of isolated chondrocytes as a result of intermittent compressive force were studied. Aggregated chick embryonic chondrocytes were exposed in vitro to intermittent compressive force (IC) of physiological magnitude. Proteoglycan synthesis and deposition in the intercellular matrix were increased as compared to control cultures. Guanidine-HCl extractions (0.5 M) reveal that, as a result of IC, the matrix shows much more coherence. Prostaglandins are probably involved in the cellular response to IC. Author (ESA)

N84-34148# Ecole Royale Militaire, Brussels (Belgium).
EVALUATION OF THE GRAVITY RELEVANCE ON BONE STRESSES BY IN VIVO MEASUREMENTS
R. BOURGOIS, F. BURNY, and M. HINSENKAMP *In* ESA The Gravity Relevance in Bone Mineralization Processes p 47-52 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

In order to determine bone-stresses and strains in vivo, an implantable strain gage transducer, fixed mechanically for short term measurements, and by bone ingrowth for long term measurements, was developed. The transducer was successfully implanted in a dog and a human subject. Author (ESA)

N84-34149# Brussels Univ. (Belgium). Service d'Orthopedie-Traumatologie.
ELECTROMECHANICAL HYPOTHESIS OF BONE DEMINERALIZATION IN WEIGHTLESSNESS
M. HINSENKAMP *In* ESA The Gravity Relevance in Bone Mineralization Processes p 53-58 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

The effect of mechanical stress on local bone remodeling is discussed. The higher demineralization of weightbearing bones after weightlessness exposure confirms the importance of the mechanical effect. A mechanism which explains bone tissue reaction by the electromechanical properties of bone and a possible substitution of the mechanical stress by electromagnetic fields is suggested. Because of the specificity of the induced electrical parameters on the cellular response, it is premature to experiment the existent induction patterns as preventive treatment of the demineralization in weightlessness. To define active electric stimulation, differences in local bone stresses between bone submitted to normal gravity condition and to weightlessness and their consequences on electric potential variations must be defined. Author (ESA)

N84-34150# Centre Hospitalier Univ. Purpan, Toulouse (France). Service Traumato-Orthopedie.
EXPERIMENTAL INVESTIGATION OF THE EFFECT OF ELECTRETS ON BONE HEALING [ETUDE EXPERIMENTALE DE L'EFFET DES ELECTRETS SUR LA CONSOLIDATION OSSEUSE]
P. CHIRON, B. DELANNES, J. PUGET, G. UTHEZA, M. RICARD, J. P. MORUCCI, and J. FABRE *In* ESA The Gravity Relevance in Bone Mineralization Processes p 59-66 Jul. 1984 refs In FRENCH
Avail: NTIS HC A06/MF A01

The effect of electrostatic fields created by polarized polymers on recent fractures and on pseudoarthroses in rabbits was studied. The resulting callous was examined radiologically, mechanically and histologically in double blind tests. Results show that the electrets help to heal the pseudoarthroses, but do not accelerate healing of recent fractures. Electret discharge in vivo is 80% in 3 weeks. Electret discharge by X ray flux is discussed. Author (ESA)

N84-34151# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SENSITIVITY OF BONE CELL POPULATIONS TO WEIGHTLESSNESS AND SIMULATED WEIGHTLESSNESS
W. E. ROBERTS, E. R. MOREY-HOLTON, and M. R. GONSALVES *In* ESA The Gravity Relevance in Bone Mineralization Processes p 67-72 Jul. 1984 refs Prepared in cooperation with University of the Pacific, San Francisco
Avail: NTIS HC A06/MF A01 CSCL 06P

A rat suspension model for simulating certain aspects of weightlessness is discussed. Perturbations in physiological systems induced by this head down suspension model are verified by flight data. Findings of a suppression of osteoblast differentiation help explain the inhibition of bone formation inflight and during Earth-bound simulations. Since the anatomical site for these studies was in the maxilla, which is gravity loaded but non weightbearing in ground-based simulations, the similarity of bone cell kinetic changes, both inflight and in the ground-based model, suggest that fluid shifts rather than unloading may play an important role in bone alterations, at least at this sampling site. Author (ESA)

N84-34156# Leiden Univ. (Netherlands). Lab. for Cell Biology and Histology.
GLYCOSAMINOGLYCANS IN FETAL BONE MINERALIZATION
C. G. GROOT and J. K. DANES *In* ESA The Gravity Relevance in Bone Mineralization Processes p 91-93 Jul. 1984 refs
Avail: NTIS HC A06/MF A01

The role of glycosaminoglycans (GAG) in mineralization was studied by digesting the organic matrix of mineralization nodules of fetal bone with several enzymes in order to obtain more information about the possible presence and nature of GAG in these noduli. Electron microscopy suggests that the organic matrix undergoes no change after digestion. It is concluded that there is no chondroitin-4-sulphate, chondroitin-6-sulphate, dermatan sulfate, keratan sulfate or hyaluronic acid present in the organic matrix in this stage of bone mineralization. Author (ESA)

N84-34157# Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
EMERGENCY HANDLING OF COMPRESSED AIR CASUALTIES
D. L. HENDERSON and B. A. HOBSON Feb. 1984 25 p
(AD-A143598; DCIEM-84-C-16) Avail: NTIS HC A02/MF A01 CSCL 06E

Work in compressed air is associated with a number of hazards, the most serious of which are the pressure-related injuries (burst lung and decompression sickness). Modern construction methods and newer decompression tables have considerably reduced overall risks. The newest treatment methods have similarly reduced morbidity and fatality risks when an accident occurs. This paper outlines the basics of emergency handling of casualties and the definitive treatment of pressure related accidents. GRA

N84-34158# Army Research Inst. of Environmental Medicine, Natick, Mass.
REGULATION AND CHARACTERISTICS OF COLD-INDUCED VASODILATION
C. A. OHATA, G. D. POWERS, and P. H. SCAGLIONE Mar. 1984 42 p
(AD-A143797; USARIEM-M18/84) Avail: NTIS HC A03/MF A01 CSCL 06S

The regulation and patterns of cold-induced vasodilation (CIVD) were identified by simultaneously monitoring circulatory and thermal responses during local cold exposure of a hindlimb in 22 cats anesthetized with chloralose. The different patterns of CIVD were categorized as hunting, sustained, combination of hunting and sustained, or no CIVD. The different regulatory mechanisms mediating CIVD were classified as baroreceptor mediated, active vasodilation, or redistribution of blood flow to skin. These cold unacclimatized cats produced primarily a hunting pattern of CIVD which was regulated predominantly by baroreceptor reflexes. The proposed mechanism of this CIVD response involves a sequence of neural reflexes elicited by cold pain, cold pressor response, baroreceptor reflex, and CIVD providing feedback inhibition of cold

nociception. Differences in the pattern and regulation of CIVD may be related to the level of cold adaptation, and may influence the effectiveness of peripheral cryoprotection provided by CIVD. GRA

N84-34159# Army Research Inst. of Environmental Medicine, Natick, Mass.
FLUID REPLACEMENT DURING HYPOTHERMIA
D. E. ROBERTS, J. G. BARR, D. KERR, C. MURRAY, and R. HARRIS 2 Mar. 1984 23 p
(AD-A143807; USARIEM-M16/84) Avail: NTIS HC A02/MF A01 CSCL 06P

Hypothermia produces acidoses, depressed cardiac function, hypovolemia and hypotension. This study was designed to examine the cardiovascular dynamics involved with restoration of the hypovolemia before rewarming. Mixed breed splenectomized adult dogs (n=16) were anesthetized with pentobarbital and cooled to a right atrial temperature of 25 deg C at a rate of 3 deg C/Hr. The animals were maintained at 25 deg C for 6 hours and rewarmed at 3 deg C/Hr. One group (1) was given no fluid, one group (2) was given saline (20% of plasma volume infused in 10 min.) two hours after reaching 25 deg C and one group (3) received saline just prior to rewarming. The hematocrit was elevated in all groups ($P \leq 0.05$) upon cooling, but did not differ between groups even after saline was given. Cardiac output (CO) at 25 deg C was 35% of precooled values. The second group increased their CO by 15% with fluid and this CO was maintained higher than groups 1 or 3 for the next four hours. Plasma volume, heart rate, and cardiac contractility returned to control levels upon rewarming, but CO remained low ($\leq$ 10%). The level of CO at the start of rewarming did not affect the final level of CO. GRA

N84-34782# Melbourne Univ., Parkville (Australia).
THE TIME IT TAKES TO SEE
G. STANLEY and M. G. KING (Defence Centre, Melbourne) *In* Melbourne Research Labs. Extracts from Symp.: Countersurveillance 1983 p 12-17 May 1984 refs
Avail: NTIS HC A09/MF A01

Although perception is experienced as immediate, considerable computation occurs on the input within our central nervous system. A distinction needs to be made between data-driven (bottom-up) and conceptually-driven (top-down) processes. These processes interact over time to determine our perception of people and objects. When the data are complex or incomplete the role of data-driven processes is lessened and conceptually-driven processing plays a greater role. Data-driven processes are relatively automatic, whereas conceptually-driven processes take more time to operate. Effective camouflage will weaken automatic processes and mislead conceptually-driven processes. Author

N84-34783# Materials Research Labs., Melbourne (Australia).
COGNITIVE PROCESSES IN TARGET ACQUISITION
C. J. WOODRUFF *In its* Extracts from Symp.: Countersurveillance 1983 p 18-22 May 1984 refs
Avail: NTIS HC A09/MF A01

The need for a better understanding of cognitive processes is highlighted. Results of field trials assessing target acquisition performance and observers' expectations as to the major target cues to acquisition are presented. The structural relations between target features are noted, and proposals for experimental quantification of the role such relations play in acquisition are outlined. The application of the results of such work to both perceptual recognition training and camoulfage design is described. Author

N84-34784# Defence Centre, Melbourne (Australia).
DETECTING CAMOUFLAGED TARGETS: THEORY INTO PRACTICE
M. G. KING and G. STANLEY (Melbourne Univ.) *In* Materials Research Labs. Extracts from Symp.: Countersurveillance 1983 p 23-32 May 1984 refs
Avail: NTIS HC A09/MF A01

Some predictions are taken from visual information processing theory with regard to expected performance in the task of camouflage detection. The dichotomy of serial processing/automatic detection is discussed in the light of experimental results. It is concluded that serial processes are usually required for the detection of a camouflaged target. A corollary of this is the implication that a single critical feature probably does not exist for typical camouflaged targets. From these experimental results, further issues are generated: (1) that the task of camouflage can be operationally defined as the retardation of the detection processes; (2) that the experimental protocol of published camouflage assessment trials should be re-evaluated in the light of the present propositions; and (3) that visual search instructions given to soliders in the field may be modified to take account of the time it takes to see. Author

N84-34913* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
APPARATUS FOR DISINTEGRATING KIDNEY STONES Patent
E. D. ANGULO, inventor (to NASA) Issued 2 Oct. 1984 7 p Filed 13 May 1982 Supersedes N82-26961 (17 - 20, p 2451)
(NASA-CASE-GSC-12652-1; US-PATENT-4,474,180; US-PATENT-APPL-SN-377891; US-PATENT-CLASS-128-328; US-PATENT-CLASS-128-24-A) Avail: US Patent and Trademark Office CSCL 06B

The useful life of the wire probe in an ultrasonic kidney stone disintegration instrument is enhanced and prolonged by attaching the wire of the wire probe to the tip of an ultrasonic transducer by means of a clamping arrangement. Additionally, damping material is applied to the wire probe in the form of a damper tube through which the wire probe passes in the region adjacent the transducer tip. The damper tube extends outwardly from the transducer tip a predetermined distance, terminating in a resilient soft rubber joint. Also, the damper tube is supported intermediate its length by a support member. The damper system thus acts to inhibit lateral vibrations of the wire in the region of the transducer tip while providing little or no damping to the linear vibrations imparted to the wire by the transducer.
Official Gazette of the U.S. Patent and Trademark Office

N84-34914*# Tufts Univ., Boston, Mass. Dept. of Anatomy and Cellular Biology.
THE COMBINED INFLUENCE OF STRETCH, MOBILITY AND ELECTRICAL STIMULATION IN THE PREVENTION OF MUSCLE FIBER ATROPHY CAUSED HYPOKINESIA AND HYPODYNAMIA Semiannual Progress Report, Jan. - Jun. 1984
G. GOLDSPINK, D. GOLDSPINK, and P. LOUGHNA Jun. 1984 60 p refs
(Contract NAG2-272)
(NASA-CR-173994; NAS 1.26:173994; SAPR-1) Avail: NTIS HC A04/MF A01 CSCL 06P

The morphological and biochemical changes which occur in the hind limb muscles of the rat in response to hypokinesia and hypodynamia were investigated. Hind limb cast fixation and suspension techniques were employed to study the musclar atrophy after five days of hypokinesia and hypodynamia induced by suspension, appreciable muscular atrophy was apparent, particularly in the anti-gravity muscles. The effect of passive stretching and electrical stimulation on muscle atrophy was studied. Changes in muscle protein mass were assessed with spectrophotometric and radioactive techniques. Passive stretch is shown to counteract muscle disuse atrophy. The change in the numbers of specific muscle fibers in atrophied muscles is discussed. R.S.F.

N84-34915# Eidgenoessische Technische Hochschule, Zurich (Switzerland). Inst. for Behavioral Sciences.
DEVELOPMENT OF A GENERAL MODEL OF THE CAR DRIVERS EYE MOVEMENT SEQUENCES AND EFFECTS OF SUBJECT AND ENVIRONMENTAL VARIABLES Final Report, 13 Mar. 1980 - 13 Mar. 1981
A. S. COHEN and R. HIRSIG May 1984 204 p
(Contract DAJA37-80-C-0255; DA PROJ. 2Q1-61102-B-74-D)
(AD-A144180; ARI-RN-84-74) Avail: NTIS HC A10/MF A01 CSCL 05J

The present study represents the continuation of past research on the driver's eye movement behavior. Previous experiments yield to describe the driver's eye movement behavior in terms of time discrete process models. The established models were not perfectly accurate in predicting the driver's future fixations of the eye. The current goal was, first, to study whether any previous presupposition was not fulfilled, or whether, secondly, there exists some upper limit regarding the causal relationship between the successive fixations of the eye. The conducted experiments empirically support the validity of the prepositions. The results also yield that a driver's visual search depended on his long-term variables. The observed eye movement behavior represented a visual adaptation to the environmental conditions. The degree of adaptation depended, however, on the individual's capabilities. GRA

N84-34916# Letterman Army Inst. of Research, San Francisco, Calif.
LASER RETINAL INJURY Final Report, Jan. - Jul. 1983
J. A. WOLFE 11 Apr. 1984 25 p
(Contract DA PROJ. 3S1-62772-A-874)
(AD-A144187; LAIR-177) Avail: NTIS HC A02/MF A01 CSCL 06R

Laser retinal injury poses a grave threat to military personnel. Both irreversible damage with potential lifelong visual disability and reversible injury with immediate interference when critical visual demands are needed can occur. Laser retinal lesions can be graded ophthalmoscopically: Grade I - retinal edema; Grade II - retinal necrosis (coagulation); Grade III - retinal hemorrhage; Grade IV - vitreous hemmorrhage and/or retinal hole formation. All 23 medically reported cases of laser retinal injury show that acute visual effects and permanence of visual disability are directly correlated with increasing grade of injury and closeness of lesion to the fovea. Laser protective eyewear gives protection only from specific wavelength(s) of laser radiation. GRA

N84-34917# Letterman Army Inst. of Research, San Francisco, Calif.
VISUAL FUNCTION CHANGES AFTER LASER EXPOSURE Final Report, 1973 - 1983
H. ZWICK Apr. 1984 32 p
(AD-A144210; LAIR-84-48) Avail: NTIS HC A03/MF A01 CSCL 06R

Contents: Visual Function Changes after Chronic or Low-light Exposure, and Experimental Assessments of Vision Changes in the Non-human Primate following Acute Laser Exposures. GRA

N84-34918# Smith-Kettlewell Inst. of Visual Sciences, San Francisco, Calif.
THE MECHANISM OF HUMAN VELOCITY DISCRIMINATION Annual Scientific Report, 1 Oct. 1983 - 30 Mar. 1984
S. P. MCKEE 9 Apr. 1984 11 p
(Contract AF-AFOSR-0345-82)
(AD-A144527; AFOSR-84-0702TR) Avail: NTIS HC A02/MF A01 CSCL 05J

Human velocity discrimination depends on the precise detection of minute time variations (under 1 msec). A physiological summation process called sequential recruitment is responsible for this remarkable temporal sensitivity. Precise velocity discrimination is possible with very brief target durations (less than 100 msec). The oculomotor systems used this sensory signal to initiate smooth pursuit eye movements. GRA

N84-34933# Walter Reed Army Inst. of Research, Washington, D.C. Dept. of Military Medical Psychophsiology.
COMPLEX DEMODULATION: A TECHNIQUE FOR ASSESSING PERIODIC COMPONENTS IN SEQUENTIALLY SAMPLED DATA
H. C. SING, S. G. GENSER, H. BABKOFF, D. R. THORNE, and F. W. HEGGE *In* ARO Proc. of the 29th Conf. on the Design of Expt. in Army Res., Develop. and Testing p 131-156 Jun. 1984
(AD-P003845) Avail: NTIS HC A17/MF A01 CSCL 12A

Circadian and other rhythmic components in data obtained from a sleep deprivation study are detected and characterized by complex demodulation. The output of this analytical technique yields both frequency and time domain representation of each periodic component of interest. Non-stationarity introduced by an experimental treatment such as progressive sleep loss, may be observed and quantified. The analytical results provide a common basis of comparison for data as diverse as cognition responses from a performance assessment battery, moodscale scores, and physiological data such as oral temperature. The procedure operates on the entire data set and variance accounted for by each component may be calculated. Author (GRA)

53

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A84-48757
THE PSYCHOPHYSICS OF SENSORY AND SENSOMOTOR PROCESSES [PSIKHOFIZIKA SENSORNYKH I SENSOMOTORNYKH PROTSESSOV]
IU. M. ZABRODIN, ED. Moscow, Izdatel'stvo Nauka, 1984, 216 p. In Russian. No individual items are abstracted in this volume.

The book contains papers dealing with methodological problems related to the execution of discrete and continuous psychophysical tasks by human operators, as well as experimental and review papers on the psychophysics of sensory and sensomotor systems. Topics discussed include new data on subthreshold phenomena, specific features of the mean error method in a system of psychophysical methods of sensibility measurements, and the method of subjectively equal states. Papers are also presented on a universal model of acoustic signal detection in the presence of noise, an experimental study of a sensomotor model of a psychophysical task, and the effect of the polarization of the visual cortex on the psychophysical characteristics of perception. V.L.

N84-34160*# Illinois Univ., Urbana. Dept. of Psychology.
THE WORKLOAD BOOK: ASSESSMENT OF OPERATOR WORKLOAD TO ENGINEERING SYSTEMS Final Report
D. GOPHER Nov. 1983 24 p refs
(Contract NCC2-233)
(NASA-CR-166596; NAS 1.26:166596) Avail: NTIS HC A02/MF A01 CSCL 05H

The structure and initial work performed toward the creation of a handbook for workload analysis directed at the operational community of engineers and human factors psychologists are described. The goal, when complete, will be to make accessible to such individuals the results of theoretically-based research that are of practical interest and utility in the analysis and prediction of operator workload in advanced and existing systems. In addition, the results of laboratory study focused on the development of a subjective rating technique for workload that is based on psychophysical scaling techniques are described. Author

N84-34161*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMBINED EFFECT OF NOISE AND VIBRATION ON PASSENGER ACCEPTANCE
J. D. LEATHERWOOD Aug. 1983 35 p refs Presented at the 108th Meeting of the Acoustical Society of America, Minneapolis, 8-12 Oct. 1984
(NASA-TM-86284; NAS 1.15:86284) Avail: NTIS HC A03/MF A01 CSCL 05H

An extensive research program conducted at NASA Langley Research Center to develop a comprehensive model of passenger comfort response to combined noise and vibration environments has been completed. This model was developed for use in the prediction and/or assessment of vehicle ride quality and as a ride quality design tool. The model has the unique capability to transform individual elements of vehicle interior noise and vibration into subjective units and combining the subjective units to produce a total subjective discomfort index as well as the other useful subjective indices. This paper summarizes the basic approach used in the development of the NASA ride comfort model, presents some of the more fundamental results obtained, describes several application of the model to operational vehicles, and discusses a portable, self-contained ride quality meter system that is a direct hardware/software implementation of the NASA comfort algorithm. Author

N84-34162# Minnesota Univ., Minneapolis. Dept. of Psychology.
COMPUTER-BASED MEASUREMENT OF INTELLECTUAL CAPABILITIES Final Report, Sep. 1976 - Jan. 1983
D. J. WEISS Dec. 1983 29 p
(Contract N00014-76-C-0243; RR0-4204)
(AD-A144065) Avail: NTIS HC A03/MF A01 CSCL 09B

The research program's objectives are described, and the research approach is summarized and related to the sixteen technical reports completed under this contract. Fifteen major research findings are presented. The implications of the research findings and methods for future research in computerized testing and adaptive testing are described. Also included are abstracts of the sixteen technical reports. Author (GRA)

N84-34163# Navy Personnel Research and Development Center, San Diego, Calif.
SPATIAL PERFORMANCE, COGNITIVE REPRESENTATION AND CEREBRAL PROCEDURES Final Report, Oct. 1983 - May 1984
P. A. FEDERICO Jul. 1984 22 p
(AD-A144095; NPRDC-TR-84-48) Avail: NTIS HC A02/MF A01 CSCL 05J

To provide converging support that the integration of analog and propositional representational systems is associated with spatial ability, visual, auditory, and bimodal brain event-related potentials were recorded from 50 right-handed Caucasian male recruits at the Naval Training Center, San Diego. Sensory interaction indices were derived for these subjects who had taken the Surface Development Test of spatial ability. Product-moment correlations were computed between sensory interaction indices for eight cerebral sites and spatial ability test scores. Sensory interaction for left and right hemispheric regions was significantly related to spatial ability. As sensory suppression decreased, spatial ability increased. The results substantiated the theory that the visual-imaginal-analog and the auditory-verbal-propositional representational systems are implicated in spatial ability. The extent to which the cortex can inhibit or attenuate the interaction or integration between these dual symbol systems is associated with complicated spatial task performance. GRA

N84-34919# Loughborough Univ. of Technology (England). Dept. of Mechanical Engineering.
RESULTS OF A QUESTIONNAIRE ON THE TEACHING OF COMPUTER-AIDED ENGINEERING (CAE) ON UNDERGRADUATE COURSES
I. WRIGHT, L. JENKINSON, and R. ANGRAVE Jun. 1984 54 p
(TT-8404) Avail: NTIS HC A04/MF A01

A project to produce resource teaching material on Computer Aided Engineering (CAE) for use in engineering undergraduate courses is discussed. The project includes a survey to assess current teaching from 79% of the 295 establishments contacted. Results show that the number of establishments teaching CAE has increased steadily. Staff shortages, access to in house developed software, and inadequate resource materials are some of the problems addressed. E.R.

N84-34920# Missouri Univ., Columbia.
ANALYSIS OF REWARD FUNCTIONS IN LEARNING: UNCONSCIOUS INFORMATION PROCESSING: NONCOGNITIVE DETERMINANTS OF RESPONSE STRENGTH Final Report, Sep. 1978 - 15 Sep. 1982
M. H. MARX May 1984 26 p
(Contract MDA903-78-G-0008; DA PROJ. 2Q1-61102-B-74-F)
(AD-A144152; ARI-RN-84-76) Avail: NTIS HC A03/MF A01 CSCL 05J

Our overall objective was to investigate the role of non-cognitive determinants of response strength. The more specific objective was to determine whether rewarded responses are differentially processed, as revealed by analysis of their subliminal processing. The major focus of the research was to ascertain the reality of claims. For example, that graphemic and semantic processing persists in spite of the subjects' inability to identify pattern-masked visual cues. In spite of timing limitations associated with the 60 Hz refreshing of our CRT display, we found consistent suprachance selection of test alternatives that were graphemic, phonemic, and semantic associates of the target words, in the absence of any ability to identify the target words themselves. Control stimulations (blanks) produced chance performance. It was concluded that these results (1) offer support for the reality of subliminal or unconscious information processing, (2) indicate the feasibility of subliminal testing of the hypothesized differential processing of rewarded responses, and (3) suggest the potential utility of adapting subliminal stimulation techniques as training procedures designed to enhance perceptual skills under severely degraded stimulus conditions, such as the detection of hidden targets in military operations. GRA

N84-34921# Perceptronics, Inc., Woodland Hills, Calif.
OPERATOR ALERTNESS/WORKLOAD ASSESSMENT USING STOCHASTIC MODEL-BASED ANALYSIS OF MYOELECTRIC SIGNALS Interim Report, 1 Oct. 1982 - 31 Mar. 1984
A. M. MADNI, R. I. SCOPP, Y. Y. CHU, and D. D. PURCELL 30 Apr. 1984 97 p
(Contract F49620-83-C-0001)
(AD-A144535; PPR-1126-84-4; AFOSR-84-0703TR) Avail: NTIS HC A05/MF A01 CSCL 05I

This interim report documents the work done to this point on autoregressive integrated moving average (ARIMA) model based analysis of myoelectric signals. The ARIMA modelling procedure and the hardware required for collecting myoelectric data are described in detail. Pattern analysis methods for characterizing the myoelectric signals under different levels of alertness/workload are discussed. Additionally, the various tasks in the experimental control package that subjects must perform while being monitored are described. Finally, an analysis of data obtained during experimental sessions is provided giving some indication of discriminability of the ARIMA signatures over different task difficulty levels and subjects. Results of this analysis indicate that the first AR parameter is the most useful feature in differentiating workload/altertness level. Additionally, this feature was shown to be reliable for each underlying level of alertness or load in a given task. GRA

N84-34922# Washington Univ., St. Louis, Mo. Behavior Research Lab.
A PSYCHOPHYSIOLOGICAL MAPPING OF COGNITIVE PROCESSES Progress Report, 1 Mar. 1983 - 29 Feb. 1984
J. A. STERN and R. GOLDSTEIN 4 May 1984 10 p
(Contract F49620-83-C-0059)
(AD-A144557; REPT-0059-84-1; AFOSR-84-0701TR) Avail: NTIS HC A02/MF A01 CSCL 05J

This technical report consists of a description of the work done in the Washington University Behavior Research Laboratories supported by the AFOSR. The text describes the hardware assembled for the proposed studies and the software which has been developed for stimulus presentation and execution. The study format is described as well as some preliminary results bearing on the issues to be addressed. Author (GRA)

N84-34923# Georgia Inst. of Tech., Atlanta. School of Psychology.
ESTIMATING THE NUMBER AND DURATION OF COGNITIVE PROCESSES USING THE WITHIN-TASK SUBTRACTIVE METHOD Final Technical Report, 15 Apr. 1983 - 14 Apr. 1984
G. M. CORSO and M. J. PATTERSON 30 Jun. 1984 63 p
(Contract AF-AFOSR-0088-83)
(AD-A144617; AFOSR-84-0696TR) Avail: NTIS HC A04/MF A01 CSCL 05J

This research was directed towards developing a methodology for partitioning choice-reaction time into component parts, using both the additive-factor and the subtractive method. This methodology involved the use of a modified Sternberg task in which the subjects viewed two horizontally presented letters and were required to classify each of the letters into either the positive or negative set. The classification procedure was performed by depressing two response keys on the same trial. Latency measures were obtained for the elapsed time between stimulus onset and the first response and between the first response and the second response. Input and output times were then derived. In addition, three different types of interruption stimuli (auditory, visual and auditory-visual) were presented at various times prior to and after the onset of the classification stimulus. Input and output latencies were differentially influenced by the different types of interruption stimuli and by the onset time of those interruption stimuli. GRA

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A84-46637
A MICROMINIATURIZED HEART MONITORING SYSTEM FOR ASTRONAUTS
L. J. WEST (Omnitek, Inc., Feasterville, PA) IN: ITC/USA/ '83; Proceedings of the International Telemetering Conference, San Diego, CA, October 24-27, 1983 . Research Triangle Park, NC, Instrument Society of America, 1983, p. 469-476.

A microminiaturized heart monitoring system used by astronauts during space walks from the Shuttle included, among other instrumentation, a voltage controlled oscillator (VCO) which was used to encode heart waveform for transmission to the Shuttle, and a matching discriminator in the Shuttle to decode the signal. In addition to small size, low power, and high reliability, additional requirements for greater than normal signal rejection by the input filter of the discriminator, and cost reduction by limiting the number of different semiconductors were used to keep lot qualification costs low. The circuits, were fabricated using thick film hybrid circuits, pretested semiconductors, and LIDs. The circuit for both the VCO and the discriminator also includes: NPO and K1200 capacitor chips, solid tantalum capacitors, one NPN transistor type, one PNP transistor type, and an integrated circuit operational amplifier. J.P.

A84-46719
REPRESENTATION AND TACTILE SENSING OF 3-D OBJECTS BY A GRIPPER FINGER
G.-I. KINOSHITA (Chuo University, Tokyo, Japan) Robotica (ISSN 0263-5747), vol. 1, Oct. 1983, p. 217-222. refs

The tactile sensor is constructed as a part of the finger of a parallel jaw hand; it is of the size of a finger and allows for a large displacement of the sensor element in response to force. The structure of the tactile sensor incorporates 20 successively and closely aligned elements, which allow for a 2.5 mm maximum displacement for each element. In the described experiments the capabilities of the tactile sensor are presented. The tactile sensor has the functions of: (1) discriminating the shape of the partial surface of an object; and (2) tracing by finger on the surface along the profile of an object. Author

A84-47259
AN APPROACH TO AN ADVANCED OXYGEN SYSTEM (AOS)
J. W. HENNEMAN and J. A. MIENTUS (Litton Industries, Clifton Precision Div., Davenport, IA) SAFE Journal, vol. 14, Fall 1984, p. 4-9. USAF-sponsored research.

A discussion is presented on the performance requirements of an Advanced Oxygen System for life support in 1990s tactical aircraft, as well as the design approaches by which these requirements may be met. The system will incorporate an onboard oxygen generating system that eliminates the conventional reliance on liquid oxygen logistics. Also used are miniaturized anti-G valves which provide automatic G-suit inflation in conjunction with positive pressure breathing, a chemical defense demisting helmet visor, and an integrated seat-mounted composite assembly that contains a single point, multiport personal equipment connector. Automatic mask and counterpressure garment pressurization is provided as a function of G-suit inflation pressure. The oxygen mask will effectively seal during high positive pressure breathing at over 50,000 ft. O.C.

A84-47262
CURRENT RESEARCH AND DEVELOPMENT OF ANTI-G SUITS
R. W. KRUTZ, JR. and M. I. DARRAH (Technology Inc., Life Sciences Div., San Antonio, TX) SAFE Journal, vol. 14, Fall 1984, p. 26-28.

The +G(z) loads which modern fighter aircraft generate are rapidly approaching man's tolerance limits. Efforts being made in the R&D community to combat these ever-increasing G-loads include new and improved anti-G suits. This paper discusses such an effort, using lower body uniform pressure to support the cardiovascular system during high +G(z) stress. Two concepts were examined, viz., multiple capstans to uniformly tighten the G-suit fabric around the leg, and reticulated foam to evenly transfer pressure from the suit to the skin. The prototype multiple capstan suit was tested and evaluated on a human centrifuge. +G(z) tolerance/endurance limits were measured in subjects wearing the multiple capstan suit and compared to those achieved with the standard CSU-13B/P anti-G suit. Bulk and ease of donning were assessed as well as compatibility with the F-15 and F-16 cockpits. An open-celled reticulated foam was the basis for the other uniform pressure anti-G suit concept. The foam provides uniform pressure distribution with minimal suit expansion during pressurization. Prototype reticulated foam anti-G suit thigh sections have been assessed, and preliminary results indicate that high skin pressure transfer ratios are attained. Author

A84-47268
MAKING SPACE A NICE PLACE TO LIVE
B. M. REGISTER Space World (ISSN 0038-6332), vol. U-9-249, Sept. 1984, p. 9-11.

Questions of 'habitability' in connection with crew station design for manned space mission are considered. 'Habitability' is defined as the individual's perception and attitude towards the quality of

life in a given environment. Physiological and psychological factors are particularly important in long-durationn space missions. Physiological changes in space form a part of the 'space adaptation syndrome'. The Skylab mission showed that there is a need for a human's well-being in space. Habitability becomes, therefore, a mixture of physical, psychological, medical, and sociological components. Attention is given to designing for habitability, the Space Station medical clinic, the living quarters, the dining room and kitchen areas of one of the living pods, the European response to America's space station, space station configurations, and an orbiting industrial module. G.R.

A84-47965
A NONLINEAR ANALYSIS OF THE EFFECTS OF TRANSIENT ELECTROMAGNETIC FIELDS ON EXCITABLE MEMBRANES
P. BERNARDI and G. DINZEO (Roma, Universita, Rome, Italy) IEEE Transactions on Microwave Theory and Techniques (ISSN 0018-9480), vol. MTT-32, July 1984, p. 670-679. refs

The transmembrane voltage produced by a transient electromagnetic field has been determined using a nonlinear model of the cellular membrane. The influence on the membrane voltage of the various parameters characterizing the incident field, such as wave-shape, time-width, and amplitude, has been analyzed. In particular, the amplitude of the incident field for which the cell's behavior can be assumed as linear and the threshold level for exciting action potentials on the membrane have been determined. Potential hazards for humans exposed to transient fields are examined in light of this interaction mechanism. Author

A84-48550
ERRORS OF VISUAL JUDGEMENT IN PRECISION MEASUREMENTS
K. TANAKA and H. YANO (National Research Laboratory of Metrology, Sakura, Ibaraki, Japan) Ergonomics (ISSN 0014-0139), vol. 27, July 1984, p. 767-780. refs

The causes of personal errors occurring in the process of precision measurement are studied for three cases of men observing measuring instruments and making judgments. Judgments based on the presence or absence of a stimulus, on the intensity of a stimulus, and on comparison are addressed. The usefulness of an improved indication system and of training in reducing personal error is examined. It is found that training is extremely effective in decreasing error, but that the effect of training tends to decrease with the passage of time. C.D.

A84-49108*# Iowa Univ., Iowa City.
PREDICTION OF TURBULENT FLOW PAST A PROSTHETIC HEART VALVE
C. H. YU, C. J. CHEN, and K. B. CHANDRAN (Iowa, University, Iowa City, IA) IN: Developments in mechanics. Volume 12 - Midwestern Mechanics Conference, 18th, Iowa City, IA, May 16-18, 1983, Proceedings . Iowa City, IA, University of Iowa, 1983, p. 107-110. refs
(Contract PHS-HL-26269; NSG-3305)

A84-49313
ENGINEERING PSYCHOLOGY: ECONOMIC PROBLEMS [INZHENERNAIA PSIKHOLOGIIA: EKONOMICHESKIE PROBLEMY]
B. A. SMIRNOV, B. A. DUSHKOV, and F. P. KOSMOLINSKII Moscow, Izdatel'stvo Ekonomika, 1983, 223 p. In Russian. refs

Problems in the economic assessment of engineering-psychology research (EPR) are examined. Particular attention is given to a general definition of the economic (cost) effectiveness of EPR, the economic effect of engineering-phychological design, economic effectiveness in connection with the determination of human-factor effects on production, and methods for the standardization of operator activity. Also considered are economic problems in connection with increasing the quality and reliability of man-machine systems; economic effectiveness in relation to the assessment of engineering-psychological requirements in the operation of complex systems; and the social significance of engineering psychology. B.J.

A84-49374
MODEL STUDIES WITH THE INVERSELY CALCULATED ISOCHRONES OF VENTRICULAR DEPOLARIZATION
J. J. M. CUPPEN (Philips Nederland, Eindhoven, Netherlands) and A. VAN OOSTEROM (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands) IEEE Transactions on Biomedical Engineering (ISSN 0018-9294), vol. BME-31, Oct. 1984, p. 652-659. refs

This paper describes experimental studies on the influence of inhomogeneities in the volume conductor, and model errors and measurement errors on the inversely calculated isochrones of ventricular depolarization. The results indicate that in the inverse problem the use of inhomogeneous models is essential, that knowledge of the exact heart geometry (shape and orientation) is important, and that signal error (noise) as encountered in normal ECG recordings is not critical. The number of (measurement) leads required is found to be on the order of 64. Author

A84-49375
A RULE-BASED MICROCOMPUTER SYSTEM FOR ELECTROENCEPHALOGRAM EVALUATION
L. BAAS (Philips Nederland, Eindhoven, Netherlands) and J. R. BOURNE (Vanderbilt University, Nashville, TN) IEEE Transactions on Biomedical Engineering (ISSN 0018-9294), vol. BME-31, Oct. 1984, p. 660-664. Research supported by Dialysis Clinics, Inc. refs

This paper describes a method for implementation of a rule-based system on a simple 8-bit microcomputer. The approach has been succesfully implemented and tested by analyzing EEG's recorded from renal patients. Author

A84-49475
FALSE CUE REDUCTION IN MOVING FLIGHT SIMULATORS
D. ARIEL and R. SIVAN (Technion - Israel Institute of Technology, Haifa, Israel) IEEE Transactions on Systems, Man, and Cybernetics (ISSN 0018-9472), vol. SMC-14, July-Aug. 1984, p. 665-671. Research supported by the Technion-Israel Institute of Technology and U.S.-Israel Binational Science Foundation. refs

When roll motion is simulated on a moving flight simulator, false cues are frequently perceived by the subject pilot that degrade the quality of the simulation. In order to reduce these false cues, an adaptive approach based on real time simulation of the subject's vestibular organs is suggested. This approach is compared both to a linear washout commonly used in moving base simulators and a previous adaptive attempt to eliminate the false cues. Author

A84-49627
VISUAL-SIMULATION OPTICAL SYSTEMS
M. SHENKER (Farrand Optical Co., Inc., Valhalla, NY) IN: Los Alamos Conference on Optics '83; Proceedings of the Third Conference, Los Alamos and Santa Fe, NM, April 11-15, 1983 . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 22-29. refs

The paper describes various methods and technologies that have evolved over the last 25 years in the area of visual simulation; emphasis is on visual displays used in flight simulation systems. Particular attention is paid to display system development; commercial flight simulation displays; military flight simulator displays; helmet mounted displays; optical scanning probes; and direct view simulation systems and parallax. L.M.

N84-34164 Texas Univ., Austin.
MODELING AND CONTROL OF AN ON-BOARD OXYGEN GENERATION SYSTEM Ph.D. Thesis
S. Y. WANG 1983 211 p
Avail: Univ. Microfilms Order No. DA8414467

The molecular sieve dual bed pressure swing process (PSA), which is used to produce large quantities of enriched oxygen gas from the ambient air, was theoretically and experimentally investigated. The full order model was derived to solve a set of

coupled nonlinear differential equations. The correct causality was assumed to save tremendous computation time. Good agreements were obtained between the simulation results and experimental data. The reduced order model was derived by treating each bed as two storage capacitors and implementing the equilibrium theory. This resulted in a fourth order model. Reasonable results can be obtained from this approach. When the system reaches steady state, it is found that PSA process can be described by only one bed. This leads to a second order model which can be used for the controller design purpose. Dissert. Abstr.

N84-34165*# National Aeronautics and Space Administration, Washington, D. C.
HUMAN CAPABILITIES IN SPACE
A. E. NICOGOSSIAN Oct. 1984 58 p refs
(NASA-TM-87360; NAS 1.15:87360) Avail: NTIS HC A04/MF A01 CSCL 05H

Man's ability to live and perform useful work in space was demonstrated throughout the history of manned space flight. Current planning envisions a multi-functional space station. Man's unique abilities to respond to the unforeseen and to operate at a level of complexity exceeding any reasonable amount of previous planning distinguish him from present day machines. His limitations, however, include his inherent inability to survive without protection, his limited strength, and his propensity to make mistakes when performing repetitive and monotonous tasks. By contrast, an automated system does routine and delicate tasks, exerts force smoothly and precisely, stores, and recalls large amounts of data, and performs deductive reasoning while maintaining a relative insensitivity to the environment. The establishment of a permanent presence of man in space demands that man and machines be appropriately combined in spaceborne systems. To achieve this optimal combination, research is needed in such diverse fields as artificial intelligence, robotics, behavioral psychology, economics, and human factors engineering. Author

N84-34166# Department of the Army, Washington, D. C.
A METHOD FOR PRODUCING NUTRITIONALLY DENSE FREEZE DRIED FOOD BARS Patent Application
D. BERKOWITZ, inventor (to Army) Filed 16 Apr. 1984 17 p
(AD-D011052; US-PATENT-APPL-SN-600241) Avail: NTIS HC A02/MF A01 CSCL 06H

A method of producing a nutritionally dense, freeze dried food item usually in bar form is described in which uncooked food ingredients are mixed together and then cooked until about 40% to about 60% of the water content is removed by evaporation. Then the partially dried mixture is formed into the desired shape, then frozen and dehydrated to a moisture level which would produce a shelf-stable product. The freeze dried bars are packaged in impermeable containers. Food bars prepared by this method dehydrate faster and to a greater extent than food bars prepared by processes incorporating a compression step. Author (GRA)

N84-34167# Royal Aircraft Establishment, Farnborough (England). Human Factors Group.
THE PERCEPTION OF SATURATION AND HUE ON COLOUR CATHODE RAY TUBES Final Scientific Report, 1 Feb. 1983 - 31 Jan. 1984
J. LAYCOCK and F. A. GREENE (AMRL, Wright-Patterson AFB, Ohio) 13 Jul. 1984 86 p
(Contract AF-AFOSR-0085-83)
(AD-A143645; EOARD-TR-84-19) Avail: NTIS HC A05/MF A01 CSCL 05H

As a result of the use of color cathode ray tubes in military aircraft, an experiment is reported which considered the perception of hue at representative luminance levels. This experiment was conducted to test the theoretical lines of constant perceived hue in 1976 Uniform-Chromaticity-Space. A unique, computer-controlled tri-stimulus colorimeter was used to present two degree stimuli for hue match at luminance levels ranging from 250 to 2000 cd/sq m. GRA

N84-34168# Army Research Inst. of Environmental Medicine, Natick, Mass.
UPPER TO LOWER BODY MUSCULAR STRENGTH AND ENDURANCE RATIOS FOR WOMEN AND MEN
J. E. FALKEL, M. N. SAWKA, L. LEVINE, and K. B. PANDOLF 30 Jun. 1984 24 p
(Contract DA PROJ. 3E1-62777-A-879)
(AD-A143821; USARIEM-M33/84) Avail: NTIS HC A02/MF A01 CSCL 06S

This study examined possible gender differences for relative upper (elbow) to lower (knee) body strength and endurance, as well as relative flexion to extension strength and endurance. Seven women and nine men who were matched for both upper and lower body aerobic power were tested on an isokinetic strength instrument. Absolute isokinetic strength was lower ($p<0.01$) for the women than the men for all measurements. When strength was expressed per lean body weight, the women were weaker ($p<0.05$) only for elbow flexion strength. The women had a lower ($p<0.05$) upper to lower body strength ratio for flexion, but not for extension. There were also no differences ($p>0.05$) in isokinetic endurance fatigue decrements, or upper to lower body endurance ratios between genders. These data indicated that there were differences in absolute strength between the genders, but strength per lean body weight, as well as upper to lower body ratios for strength and endurance were similar for both genders. It was recommended that aerobic fitness and level of training be taken into account strength and endurance were compared between the genders. GRA

N84-34169# Air Force Human Resources Lab., Brooks AFB, Tex.
VALIDATION OF RELATIVE-TIME-SPENT RATING SCALES Interim Report, Jul. - Dec. 1981
S. K. GARCIA Jul. 1984 41 p
(Contract AF PROJ. 7719)
(AD-A144067; AFHRL-TP-84-11) Avail: NTIS HC A03/MF A01 CSCL 05I

Relative-time-spent rating scales are used as the primary measuring device in task-oriented job inventories. These scales permit incumbents to report the amount of work time they spend on each task performed relative to time spent on other tasks. Measures of relative time spent are currently being collected by the Air Force and other governmental agencies; however, no consensus has been reached regarding the optimal scale format to use in obtaining time spent-performing data. The general lack of consensus regarding the optimal scale has stemmed primarily from the difference among scientists in their opinions about scaling procedures, scale construction, application of scales and validity of scales. This paper summarizes the results of a feasibility study conducted to validate various relative-time-spent scale formats. The criterion for validation was collected via direct field observations. The primary objective of this investigation was to determine the relative validity of binary (perform/not perform), 9- and 25-point scales using actual time spent and frequency of observed task performance criteria. Results of this investigation indicated that the 9-point relative-time-spent scale provided the optimal format for use in the Air Force occupational analysis program. Author (GRA)

N84-34170# California Univ., Berkeley. Lawrence Berkeley Lab. Applied Science Div.
CONTROL OF RESPIRABLE PARTICLES AND RADON PROGENY WITH PORTABLE AIR CLEANERS
F. J. OFFERMANN, R. G. SEXTRO, W. J. FISK, W. W. NAZAROFF, A. V. NERO, K. L. REVZAN, and J. YATER Feb. 1984 98 p refs
(Contract DE-AC03-76SF-00098)
(DE84-013878; LBL-16659; EEB-VENT-83-22) Avail: NTIS HC A05/MF A01

Eleven portable air cleaning devices were evaluated for control of indoor concentrations of respirable particles and radon progeny. Following injection of cigarette smoke and radon in a room-size chamber, decay rates for particles and radon progeny

concentrations were measured with and without air cleaner operation. Particle concentrations were obtained for total number concentration and for number concentration by particle size. In tests with no air cleaner the natural decay rate for cigarette smoke was observed to be 0.2 hr(-1). The electrostatic precipitators and extended surface filters had significant particle removal rates, and a HEPA type filter was the most efficient air cleaner. The air cleaners which were effective in removing particles were also effective in removing radon progeny. At low particle concentrations plateout of the unattached radon progeny is an important removal mechanism. It is found that the plateout rate for unattached progeny is 15 hr(-1). The unattached fraction and the overall removal rate due to deposition of attached and unattached nuclides are estimated for each radon decay product as a function of particle concentration. DOE

N84-34408# Royal Aircraft Establishment, Bedford (England).
ASSESSING PILOT WORKLOAD IN FLIGHT
A. H. ROSCOE *In* AGARD Flight Test Tech. 13 p Jul. 1984 refs
Avail: NTIS HC A16/MF A01

A method by which a pilot's heart rate can be recorded to support, or occasionally question, his subjective rating of workload is described. Examples from RAE Bedford trials are presented to illustrate the technique, and the BAe 146 crew complement certification exercise is described. A flight experiment which compares heart rate levels and workload ratings in a more scientific manner is described. The rationale for using heart rate in this way is discussed. E.A.K.

N84-34924# Army Aeromedical Research Lab., Fort Rucker, Ala.
ENERGY-ABSORBING EARCUP ENGINEERING FEASIBILITY EVALUATION
T. A. HUNDLEY and J. L. HALEY, JR. Jul. 1984 32 p
(Contract DA PROJ. 3E1-62777-A-878)
(AD-A144179; USAARL-84-8) Avail: NTIS HC A03/MF A01 CSCL 06Q

The concept of using the integral structure of a noise-attenuating earcup as a load-limiting or energy-absorbing device is explored in this report. The standard earcup of the Army's SPH-4 flight helmet is a very rigid structure which requires a force of approximately 22,000 newtons to cause it to deform, a force level three times greater than the crushing strength of the skull. Fifteen different crushable earcups were constructed and evaluated for noise attenuation to determine their suitability for prototype construction. Three earcups were selected for the crushability evaluation. The corrugated aluminum earcup was selected as the best of the three evaluated. The aluminum earcup was modified to lower the cost and to increase the crushing depth to nearly 2 cm. The feasibility of producing a crushable earcup with similar noise attenuation characteristics to the existing Army SPH-4 earcup was demonstrated. GRA

N84-34925# Tactical Air Warfare Center, Eglin AFB, Fla.
F-15 LIMITED FIELD OF VIEW VISUAL SYSTEM TRAINING EFFECTIVENESS EVALUATION Final Report, 9 Jan. - 13 Apr. 1984
M. E. ONEAL Jul. 1984 48 p Original contains color illustrations
(AD-A144309) Avail: NTIS HC A03/MF A01 CSCL 05I

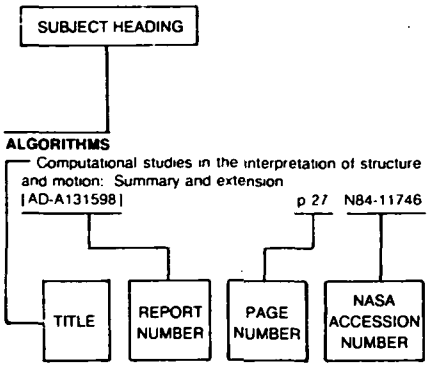
This report covers the F-15 Limited Field of View (LFOV) Visual System Training Effectiveness Evaluation. This evaluation was conducted at Goodyear Aerospace Corp., Akron, OH. The evaluation used F-15, F-16, and A-10 instructor pilots from Headquarters Tactical Air Command, Pacific Air Forces, Alaskan Air Command, and United States Air Forces in Europe. A visual system integrated with the F-15 Operational Flight Trainer (OFT) was evaluated to determine the training capability of the system for the initial and operational training of air superiority, air-to-surface combat, and transition tasks. The results of this evaluation will be used to determine if a LFOV visual system should be acquired for the F-15, F-16, and A-10 OFT. GRA

N84-34926# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Biomedical Engineering.
GAZE CONTROL DURING HORIZONTAL AND VERTICAL TARGET TRACKING Final Report
A. T. BAHILL Mar. 1984 23 p
(Contract AF-AFOSR-0137-83)
(AD-A144484; AFOSR-84-0698TR) Avail: NTIS HC A02/MF A01 CSCL 05J

The Honeywell oculometer has a noise level of about 0.1 deg(2): eye tracking is noisier than head tracking; vertical eye tracking is noisier than horizontal eye tracking. It has about 25% crosstalk of the horizontal channel into the vertical channel. It has an 84 ms time delay. It is not effective at detecting and rejecting eye blinks; typical eye blink artifacts last 50 to 200 ms. The human tracks best when tracking with eyes alone. Although tracking with head and eyes should be more natural, the human does worse when he uses his head. Head only tracking is the worst of the three conditions. GRA

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Supplement 266)* JANUARY 1985

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

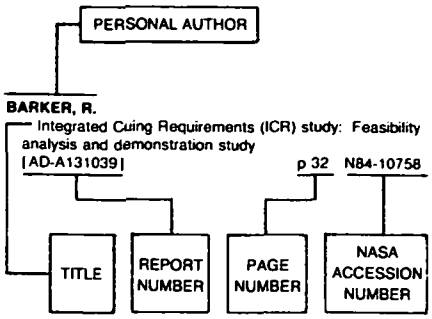
U

V

W

Y

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

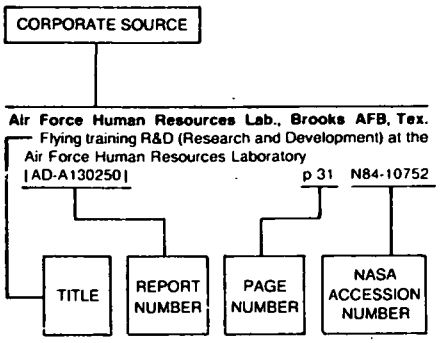
V

W

Y

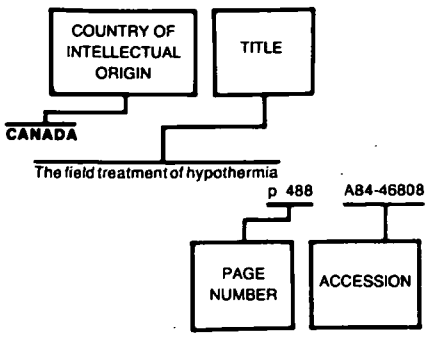
Z

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document.

Typical Foreign Technology Index Listing



Listings in this index are arranged alphabetically by country of intellectual origin. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the citation in the abstract section.

A

AUSTRALIA

The time it takes to see
p 493 N84-34782

Cognitive processes in target acquisition
p 493 N84-34783

Detecting camouflaged targets: Theory into practice
p 493 N84-34784

B

BELGIUM

Current methods of evaluation of bone mineral content
p 491 N84-34142

Urinary excretion of hydroxylysyl glycosides as an index of bone metabolism
p 491 N84-34143

Analysis of collagen and noncollagenous proteins in bone particles fractionated by qradient density fractionation
p 491 N84-34144

Evaluation of the gravity relevance on bone stresses by in vivo measurements
p 492 N84-34148

Electromechanical hypothesis of bone demineralization in weightlessness
p 492 N84-34149

Animal models of disuse osteoporosis
p 486 N84-34153

C

CANADA

The field treatment of hypothermia
p 488 A84-46808

Contact lenses and other ophthalmic innovations and their relationship to the flight environment
p 488 A84-46809

Emergency handling of compressed air casualties
[AD-A143598] p 492 N84-34157

F

FRANCE

Retinal verses extraretinal influences in flash localization during saccadic eye movements in the presence of a visible background
p 489 A84-48859

Protein Single Crystal Growth Under Low Gravity
[ESA-SP-1067] p 483 N84-34118

The Gravity Relevance in Bone Mineralization Processes
[ESA-SP-203] p 490 N84-34138

Bone changes in acutely immobilized patients: Results and perspectives
p 491 N84-34140

Experimental investigation of the effect of electrets on bone healing
p 492 N84-34150

Use of primate model in weightlessness bone physiology: General problems
p 486 N84-34154

Use of primate model in weightlessness bone physiology. Histological approach after iliac crest biopsy
p 486 N84-34155

G

GERMANY, FEDERAL REPUBLIC OF

Carbohydrate-protein interactions
p 484 N84-34123

Protein single crystal growth under microgravity
p 484 N84-34124

The so-called Wolff's law and the adaptation of bone to microgravity
p 491 N84-34145

I

ISRAEL

False cue reduction in moving flight simulators
p 497 A84-49475

ITALY

Cell membrane nonlinear response to an applied electromagnetic field
p 480 A84-47963

A nonlinear analysis of the effects of transient electromagnetic fields on excitable membranes
p 497 A84-47965

J

JAPAN

Representation and tactile sensing of 3-D objects by a gripper finder
p 496 A84-46719

Errors of visual judgement in precision measurements
p 497 A84-48550

Eye-position signals in successive saccades
p 489 A84-48860

Ultrastructural alterations in skeletal muscle fibers of rats after excercise
[NASA-TM-76976] p 483 N84-34117

N

NETHERLANDS

Model studies with the inversely calculated isochrones of ventricular depolarization
p 497 A84-49374

A rule-based microcomputer system for electroencephalogram evaluation
p 497 A84-49375

Application of protein crystals for structure and function analysis
p 483 N84-34119

Crystallaization of the membrane protein rhodopsin
p 483 N84-34120

Fibrinogen, plasminogen and tissue-type plasminogen activator: Their role in the fibinolytic system
p 484 N84-34121

Diffusion profiles in microgravity protein crystallization experiments
p 484 N84-34125

On Froude's number and the thickness of bones during gowth
p 491 N84-34139

Mechanical force and cartilage metabolism
p 492 N84-34147

Glycosaminoglycans in fetal bone mineralization
p 492 N84-34156

S

SWEDEN

The stabiliity of atropine, stored in the Swedish autoinjector
[FOA-C-40191-C3] p 484 N84-34127

SWITZERLAND

The potential of low dose computed tomography in assessing space flight induced bone loss
p 491 N84-34141

Mechanochemical effects in demineralization and mineralization of bone
p 491 N84-34146

Morphometric and biophysical study of bone tissue in immobilization-induced osteoporosis in the growing rat
p 485 N84-34152

Development of a general model of the car drivers eye movement sequences and effects of subject and environmental variables
[AD-A144180] p N84-34915

T

TAIWAN

Application of compartmentalization/air lock of simulated pressurized aircraft and tolerance of lung to rapid decompression in different laboratory animals
p 486 N84-35053

U

U.S.S.R.

On the problem of the specificity of responses of heart rhythm to certain types of mental task load
p 487 A84-46532

Phenomenon of the false localization of a visual image and the functional asymmetry of the human brain
p 487 A84-46533

Training of the vestibular stability of students in physical-education classes
p 487 A84-46534

Pattern of external breathing and gas exchange during the combined effect of hypoxia and hypercapnia on the body
p 487 A84-46536

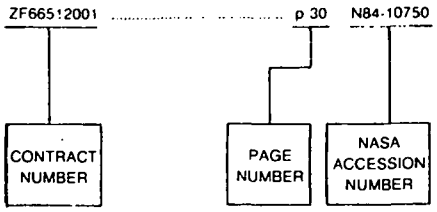
Investigation of the respiration, hemodynamics, cardiodynamics, and oxygen regimes in athletes in mountain conditions
p 487 A84-46536

Factors determining the efficiency of the voluntary reduction of ventilation during muscular work using instrumented feedback
p 487 A84-46537

Effect of geomagnetic disturbances on the conditions of cardiovascular functions in athletes
p 488 A84-46538

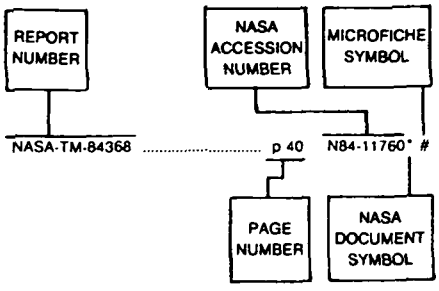
UNITED KINGDOM

Typical Contract Number Index Listing



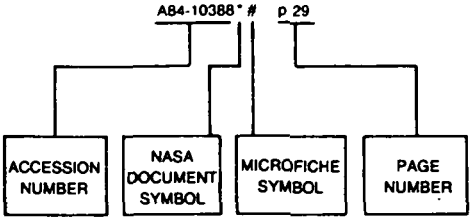
Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the AIAA accession numbers appearing first. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.

Typical Report Number Index Listing



Listings in this index are arranged alphanumerically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

Typical Accession Number Index Listing



Listings in this index are arranged alphanumerically by accession number. The page number listed to the right indicates the page on which the citation is located. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA SP-7011(266)		

4. Title and Subtitle	5. Report Date
Aerospace Medicine and Biology Continuing Bibliography (Supplement 266)	January 1985
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 148 reports, articles and other documents introduced into the NASA scientific and technical information system in December 1984.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified - Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	62	$7.00 HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1985

FEDERAL DEPOSITORY LIBRARY PROGRAM

The Federal Depository Library Program provides Government publications to designated libraries throughout the United States. The Regional Depository Libraries listed below receive and retain at least one copy of nearly every Federal Government publication, either in printed or microfilm form, for use by the general public. These libraries provide reference services and inter-library loans; however, they are *not* sales outlets. You may wish to ask your local library to contact a Regional Depository to help you locate specific publications, or you may contact the Regional Depository yourself.

ARKANSAS STATE LIBRARY
One Capitol Mall
Little Rock, AR 72201
(501) 371-2326

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
Montgomery, AL 36193
(205) 279-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.—Box S
University, AL 35486
(205) 348-7369

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor—State Cap.
1700 West Washington
Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
Tucson, AZ 85721
(602) 626-5233

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

UNIV. OF COLORADO LIB.
Government Pub. Division
Campus Box 184
Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
Govt. Pub. Department
1357 Broadway
Denver, CO 80203
(303) 571-2131

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

UNIV. OF FLORIDA LIBRARIES
Library West
Documents Department
Gainesville, FL 32611
(904) 392-0367

UNIV. OF GEORGIA LIBRARIES
Government Reference Dept.
Athens, Ga 30602
(404) 542-8951

UNIV. OF HAWAII LIBRARY
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230

UNIV. OF IDAHO LIBRARY
Documents Section
Moscow, ID 83843
(208) 885-6344

ILLINOIS STATE LIBRARY
Information Services Branch
Centennial Building
Springfield, IL 62706
(217) 782-5185

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

UNIV. OF IOWA LIBRARIES
Govt. Documents Department
Iowa City, IA 52242
(319) 353-3318

UNIVERSITY OF KANSAS
Doc. Collect—Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

UNIVERSITY OF MARYLAND
McKeldin Lib.—Doc. Div.
College Park, MD 20742
(301) 454-3034

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
In cooperation with University of Nebraska-Lincoln

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(In cooperation with North Dakota State Univ. Library)

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA DEPT. OF LIB.
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927—Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderman Lib.—Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344